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# The Shipping Exhibition

ENCOURAGING indeed in the present deplorable state of industry generally is the fact that a record number of over 300 exhibitors has been able to support the eleventh of the series of biennial Shipping, Engineering, and Machinery Exhibitions now being held at Olympia, London. It is an object-lesson in effort successfully accomplished against heavy odds, for on no section of industrial enterprise has economic distress fallen more heavily than on those industries which are represented at the show—a splendid fight against the long odds of adversity.

The exhibits reflect enterprise as well as variety, and of novelty there are numerous examples. A striking aspect is the number of manufacturing concerns, more particularly electrical ones, that have hitherto catered for markets outside the marine business, which are now finding potential customers amongst shipbuilders and shipowners. Electricity has now definitely "gone to sea": many of the most modern liners are just about as "all electric" as they can be, and there can scarcely be many builders or owners of ships who are not cognisant of the potentialities of electric power, heat, light, and communications, even though they may not at the moment be disposed to avail themselves of them.

In marine-engineering practice it is extremely difficult to jettison long-established prejudice. Customs remain, at times, in defiance of progress, perhaps for the main reason that any semblance of departure from commonly-recognised traditions of reliability are viewed with suspicion and only attempted after much hesitation. Originally midway between the Clyde and the Tyne, the centre of gravity of marine engineering construction moved at one time towards the centre of the European continent, but Witton and Rugby, together with Belfast, have pulled it back again somewhat. The electrical industry is going to sea with enthusiasm, and in normal times it should find a useful outlet for its products if it will only shout its wares and "tell the world" what it has to sell.

The subtlety of propaganda consists in so preparing the minds of potential customers that in time the idea one is trying to sell them must appear to them to be obvious. To do that we must believe in our product and make our customer do likewise, for as Mr. A. C. Hardy remarks in his provocative economic critique submitted to the Institute of Marine Engineers at Olympia, in "selling" the marine electrician is faced with an entirely different problem from the shipbuilder. The latter must capitalise his previous experience as an earnest of ability to do new work. The former must educate his public generally to electricity and in particular to his own electricity, and above all assure him of its reliability. Cost must be carefully considered, for it is not fair that it should be loaded with more than its fair share of the heavy establishment charges under which the marine departments of electrical firms are sometimes compelled to labour. Someday a purely marine firm which can build with experience both prime-movers and electrical plant may put them out of the shipping business.

Mr. Hardy suggests that it would be very valuable to all concerned if at some time in the near future it were possible to hold a small conference in which all

interests connected with the electric propulsion of ships could meet and consider their joint problems from a marketing point of view, for shipbuilding and marine engineering are no longer a profession; they are definitely a trade, and no trade can flourish without well-dressed shop windows and competent men behind the counter.

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**Careful Economy**

IT is satisfactory that the Ministry of Health in its circular issued to local authorities asking them to subject to careful and detailed scrutiny the whole field of their expenditure, should have deprecated any wholesale and ill-considered course of cutting down expenditure irrespective of its character or its purpose. Ratepayers and taxpayers are very largely the same people and, if at all possible, while the Government burden is heavy, the local one should be light. The interests covered by the Ministry of Health are, of course, very different in character from those of the Ministry of Transport and the Electricity Commissioners, and it may be easier for local authorities to hold their hand in respect of Health affairs than suddenly to revise or restrict their electricity development. The Ministry of Health urges local committees to pay special regard to whether a service is or is not likely to be remunerative either at once or in the near future, whether it is justifiable because it makes contribution to the provision of employment for local workers, and to some other similar considerations. Now municipal councillors should treat this circular as applying purely to matters covered by the Ministry of Health. Outlays for the upkeep and reasonable extension of electricity supply undertakings are expenditure intended to earn new revenue, to earn larger profits, possibly to reduce rates, and to assist industrial development. Of course, electrical committees must recognise their own responsibility, but they must use the knife with great discrimination as regards a revenue-earning electrical undertaking, or they may do more harm than good. There may be, probably are, some frills—the growth of years may-be—that can be dispensed with. If so, let them go!

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**Telephone Revenue**

ACCORDING to the latest available statistics, some 2,006,040 Post Office telephones are now in use in Great Britain and Northern Ireland, the rate of increase being indicated by the fact that the two-millionth instrument was installed at the end of June last. Those figures are nothing to be proud of considering the total population of the country, but at the present parlous juncture of State finance it is worth while taking note of the Telephone Development Association's suggestion that if every subscriber would contrive to make only one extra local call per line per day the additional annual gross revenue which would accrue to the Post Office—and therefore, under the present system, to the national exchequer—would be the not inconsiderable amount of £3,050,852!

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**The February Fair.**

WE trust that business men overseas will place the British Industries Fair of next February prominently amongst their plans, and do everything possible to time their visits to these islands so that they can view the large collection of electrical exhibits at Birmingham, as well as the allied classes of goods in London. These lines are written more immediately for the eyes of our readers who are somewhat far off, and whom we want to reach in good time. British electrical manufacturers have plenty of good material to show—the economic crisis has not altered that—and, if buyers will come, brisk business will be done. Britain is saving herself; but the purchasing support of our overseas kith and kin and other friends will help to maintain and expand our electrical industry, and so do something to hasten the return of prosperity.

**A Message from New Zealand**

LET it be noted here once again then, for the benefit of all such readers, that in 1932, from February 22nd to March 4th, is the period during which they will be welcomed to Castle Bromwich, Birmingham. There are some people who think the time is wrong; but there it is, for this Fair at any rate. The future we need not discuss further just now, but we wish to place it on record that we have this week been informed that the Council of the British (U.K.) Manufacturers' Association of New Zealand has written to the Birmingham Chamber of Commerce expressing the view that the months of May, June, and July are more suitable than February for the holding of the Fair. They say that " it is felt " that most New Zealand business men visit England later in the year than February, and promise their support to any movement designed to bring about an alteration of the date. May we be so bold as to ask the New Zealand businessmen whether they have explored all the avenues of possibility which will enable them to come Home in February, 1932, whatever they may do in later years? After all, as things are, buyers who do not come in February miss the only great united effort made by the electrical trade during the whole year. At any other time they may cover many miles, and visit many of our manufacturing centres, and still see less than will be on view at Birmingham. We are out to sell every ounce of British electrical product, and we believe that it is British goods that they want to buy.

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**The Illumination Congress**

THE first stage of the great conference on illumination, the first of the kind to take place in this country, has now been completed. The International Illumination Congress proper is over, and the " surviving " visitors have spent this week at Cambridge, where the session of the International Commission on Illumination has been in progress. Reviewing briefly the initial period thus completed, one might say that the Congress has been favoured specially in three respects—two of them the results of the honest endeavours of its organisers and members, and one beyond the control of man, but well deserved. No one who has studied the papers (and it will take him some time to do so with any completeness) can fail to be struck by their scope and variety. They form a striking illustration of the growth of illuminating engineering and, when ultimately published, should make an imposing volume. Next we find general agreement that the Congress has been organised in a singularly able manner, and everyone will wish to congratulate the hon. general secretary (Col. C. H. S. Evans) on the result of his conscientious and long-sustained efforts. Thirdly—and here good fortune has aided foresight—the Congress has been, on the whole, fortunate in its weather. On at least three specially important occasions—the river trip in London, the voyage down the Clyde, and the visit to Gleneagles—the weather was fine. Finally, one would like to congratulate the organisers of the Congress on their courageous enterprise in carrying through this event during a period of unprecedented financial and industrial depression. Even the fact of the flood-lighting appearing almost simultaneously with the political crisis must on the whole be considered fortunate; it diverted people's minds at a moment when relief was timely!

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**The Faraday Celebrations**

The successful meetings of the International Illumination Congress during the past few weeks are (however great their importance from a technical and spectacular point of view) but a prelude to the Faraday centenary celebrations which start next Monday. In our issue of August 28th, Faraday's life and work were fully dealt with; next week it will be our duty and privilege to report the organised commemoration of what Faraday's genius has meant to the world.

# The International Illumination Congress

## Concluding report of provincial tour and papers presented at Edinburgh, Buxton, Sheffield, and Birmingham

(By OUR SPECIAL COMMISSIONER)

THE journey of delegates from Glasgow to Edinburgh was broken by a visit to Gleneagles (surely one of the most delightfully situated golf courses in the British Isles) and, as the weather again proved kind, everyone enjoyed immensely this interlude, which included a trip in a Handley-Page aeroplane to Loch Lomond.

On arrival in Edinburgh the party was again hospitably received and conducted to the hotel, and in the evening there was a motor tour of the streets which enabled members to get a glimpse of the floodlighted castle—Edinburgh's only floodlighting demonstration, but an exceedingly dignified and impressive one. Never were the advantages of a commanding site more strikingly demonstrated.

As previously explained, the sessions at Edinburgh were devoted to public lighting, diffusing materials, aviation lighting, and physiological problems. Attention was centred mainly in the public lighting session, in which members of the Association of Public Lighting Engineers took part. An opening address of welcome was given by Bailie McKechnie, and Mr. Paterson and Mr. Thomas Wilkie replied briefly on behalf of the Congress and the Association of Public Lighting Engineers, the latter subsequently transferring the "chain of office" to Mr. R. Beveridge (Edinburgh) who becomes president for the coming year and who has taken a leading part in the work of the local organising committee for the Congress. Mr. Beveridge then introduced Dr. N. A. Halbertsma (Holland) who, as mentioned in our last issue, presided over this session in an able manner.

Hackney Borough Council's Electricity Showrooms

St. John's Church and War Memorial, Hackney

### Public Lighting

The morning session on public lighting was devoted mainly to papers of a descriptive or statistical character. Thus Mr. A. P. Allan and Mr. J. M. Campbell dealt with the lighting of seaside resorts, whilst Sir Francis Goodenough and Mr. W. J. Jeffery reviewed, respectively, recent developments in gas and electric lighting. (Dr. Halbertsma, who emphasised the fact that there was ample room for both illuminants, handled the discussion on these topics in a very tactful manner.) The paper by Mr. W. S. Stiles entitled "Mass Experiments in Street Lighting" reviewed the results of the now familiar experiments in Sheffield and Leicester, where an attempt was made to assess such factors as presence or absence of glare, general appearance, etc., by appeal to a number of spectators. M. A. Gouffé (France) described a process of treating illumination based on the consideration of circular and elliptical areas. Amongst those who joined in the discussion of these papers were Mr. J. K. Brydges (Borough Engineer, Eastbourne), Mr. C. S. Shapley (Leeds), Mr. S. B. Lanslands (Glasgow), Mr. Haydn T. Harrison, Mr. J. M. Waldram, Dr. Schneider (Germany), M. Reclus (France), and Mr. R. Watson (Doncaster). Apart from the tendency to debate statistical data on the number of streets lighted by gas or electricity, such topics as the value of "cut-off" in diminishing glare, the possibility of enforcing the extinction of motor-headlights in well-lighted streets, and the analysis of "psychological effect" were discussed. The position was perhaps particularly well stated in the contribution of Dr. Schneider, who remarked on the number of complex factors entering into street lighting and the advisability of postponing any too rigid decisions.

The first three papers on the afternoon list, "The British Standard Specification for Street Lighting" (Mr. C. C. Paterson), "British Street Lighting in the Lower Classes of the Standard Specification" (Mr. E. J. Stewart), and "The Lighting Requirements of Different Types of Streets" (Messrs. W. S. Stiles and J. F. Colquhoun), led to a good technical discussion in which, amongst others, Mr. J. C. Clark, Mr. Ward Harrison (U.S.A.), Sir Francis Goodenough, Mr. W. J. Jones, Mr. J. F. Colquhoun, Mr. R. Watson, Dr. Wissmann (Germany), Mr. T. E. Ritchie, Mr. C. H. Stickney (U.S.A.), Sig. Clerici (Italy), and M. Partridge (France) joined. Signor Clerici's contribution, describing the lighting of the arterial road from Rome to Ostia, aroused keen interest. On this famous roadway, about 14 miles long, there are no fewer than 3,000 "staggered" lamp posts, each equipped with a 60-watt unit.

Deptford (West) Power Station

### Standard Specification

Mr. Paterson gave a useful summary of experience and revisions of the specification since its presentation at Saranac in 1928. He emphasised the danger of regarding minimum illumination as a "criterion of excellence" instead of a method of grouping, and explained the distinction between the "maximum" and the (lower) "recommended maximum" for heights of suspension. Another revision enables data on "aver-

age illumination" (which is, however, by no means easy to calculate) to be presented. Mr. Stewart's paper was welcome as a presentation of the needs of second-class streets, which are apt to be neglected. Although some argument about the specification took place, there was a general inclination, in the discussion, to regard it as "the best possible compromise."

Other papers, including "Street Lighting by Gas in South London" and "American Street-lighting Practice," were only briefly presented. It is impossible to do more than mention a few outstanding papers in the other sections, but special mention should be made of "The Light Distribution of Navigation Lamps," presented by Mr. H. N. Green, and "Ground-lighting Equipment for Aviation," presented by the British National Committee, which deserved more detailed discussion; and of the two papers on opal glasses by Mr. J. W. Ryde and Mr. B. S. Cooper.

In the evening there was a civic reception at the Edinburgh College of Art, when an address was delivered by the Lord Provost and responses were made by Sig. Clerici (Italy) and Mr. Paidaff (Argentina).

### Public Lighting Engineers

The final event on Tuesday morning, before members departed for Buxton, was the annual general meeting of the Association of Public Lighting Engineers, when an able presidential address was delivered by Mr. R. Beveridge, and an informative annual report presented by Mr. E. J. Stewart. Mr. Beveridge's address dealt with such topics as the preparation of accounts by departments concerned with public lighting, the lighting of arterial roads, and the possibility of a central advisory council to review public lighting on a national basis, and was followed by a series of lantern slides illustrating public lighting in Edinburgh. The annual report, as usual, contained a useful record of developments by public lighting engineers throughout the country. In the course of the proceedings it was announced that the 1932 Congress would be held in Blackpool.

### Midlands Visits

The weather was not quite so favourable at Buxton, the next centre, and the visit thence to Sheffield was made under a sombre sky. Visitors, however, profited by visits to many famous local works and buildings, amongst which the laboratories of the Corporation Lighting Department, under the supervision of Mr. J. F. Colquhoun, proved a popular item.

The programme of papers at Buxton was an exceptionally varied one. In the morning there were no fewer than four sessions devoted, respectively, to "Architectural Lighting," "Industrial Lighting," "Light Sources," and the "Lighting of Railways, Mines, and Kinema Studios." In the afternoon the study of architectural lighting was resumed (in all seven papers being presented under this head), and three papers reviewing electric light on the farm (Mr. R. B. Matthews), the artificial lighting of greenhouses, and plant cultivation by artificial light were read.

At most centres of the Congress there has been one session that has "stood out." At Buxton the subject of architectural lighting seemed to attract most visitors. Mr. L. C. Kalff's thoughtful paper on "Illumination and Architecture" dealt with fundamental principles, and more especially shadow effects on the exteriors of buildings as produced by natural and artificial light. Mr. R. W. Maitland and Mr. H. Robertson ("Electric Light as Related to Architecture") dealt more with methods, and concluded with a survey of pleasing installations in England, many of which could well bear comparison with similar ones abroad. Mr. Jones's paper was devoted to engineering aspects, and contained a considerable amount of useful data (evidently even architectural lighting can make use of a certain amount of "engineering data," and is not entirely ruled by caprice!). There was also an informative survey of developments in France by M. H. Maisonneuve and M. J. Wetzel, and mathematical data from MM. J. Dourgnon and P. Waguet. In the course of the afternoon's discussion Mr. Ward Harrison showed some pleasing slides of American installations, and explained what was being done in that country to encourage co-operation between architects and lighting engineers. Much of the final discussion, indeed, dealt with this point, and ultimately some resolutions were framed recording a desire for frequent interchange of views, the provision of instruction in illuminating engineering in courses for architects, and consultation between architects and lighting engineers at an early stage in the planning of buildings.

In connection with industrial lighting, Dr. H. Lux presented the now familiar recommendations of the Illuminating Engineering Society in Germany, and Mr. N. Goldstern and Mr. F. Putnoky an able and comprehensive survey of textile lighting. A cleverly assembled and stimulating contribution by Dr. M. Luckiesh and Mr. Frank K. Moss asserted the claims of "humanitarian foot-candles" (i.e., illumination exceeding the productive or utilitarian value).

Amongst many other interesting papers read at Sheffield, one can only comment briefly on those presented by Mr. A. Cunnington and M. Partridge (France) on railway lighting, which led to a useful discussion. Here again there was evidence of a feeling—perhaps more justified than in the case of industrial lighting—in favour of "humanitarian" foot-candles, beyond the somewhat meagre allowance with which most railway companies seem content. In the evening visitors inspected an exhibit arranged at Buxton Station of modern railway carriage lighting, and some of the latest forms of daylight railway signals.

At Birmingham, the final centre before the second stage of the Congress commenced at Cambridge, there was again a very varied series of topics discussed, amongst which may be mentioned coloured signal glasses, motor car headlights, light traffic signals, and heterochromatic photometry. There were also some specially attractive local visits, notably to the works of Lucas's, Ltd., and Chance Bros., Ltd., where many interesting things were seen, and a well schemed display of experimental street lighting in the Hagley Road.

Saturday (September 12th) was devoted to a day-trip to Stratford-on-Avon, and on Sunday visitors arrived at Cambridge, where the session of the International Commission on Illumination is being held.

### London's Floodlighting

A special display of photographs illustrative of illuminations in the metropolis has been added to the exhibition the Professional Photographers' Association is now holding (September 4th to 29th) at the Prince's Galleries, Piccadilly. This collection of over sixty pictures of floodlighting effects has been brought together from many sources, and is the only one at present on view. It is very comprehensive, and includes photographs of floodlighting in the provinces, which will be added to from time to time as new views come to hand.

One of the illustrations on page 419 shows the floodlighting of the Deptford (West) generating station for the London Power Co. The whole of the river frontage is involved in this scheme, and the effective results achieved will be gathered from the night photograph which shows the boiler-house section. This elevation, which is approximately 120 ft. in height, is illuminated by 18 "Holophane" FL.1000 projector units with rectangular beam front lenses, and 1,000 floodlighting type lamps attached to a special girder erection on the walls of the pump house, approximately 60 ft. from the actual frontage illuminated. The turbine and switch-room sections to the right of this subject are illuminated from a similar girder staging fixed to the end of another building.

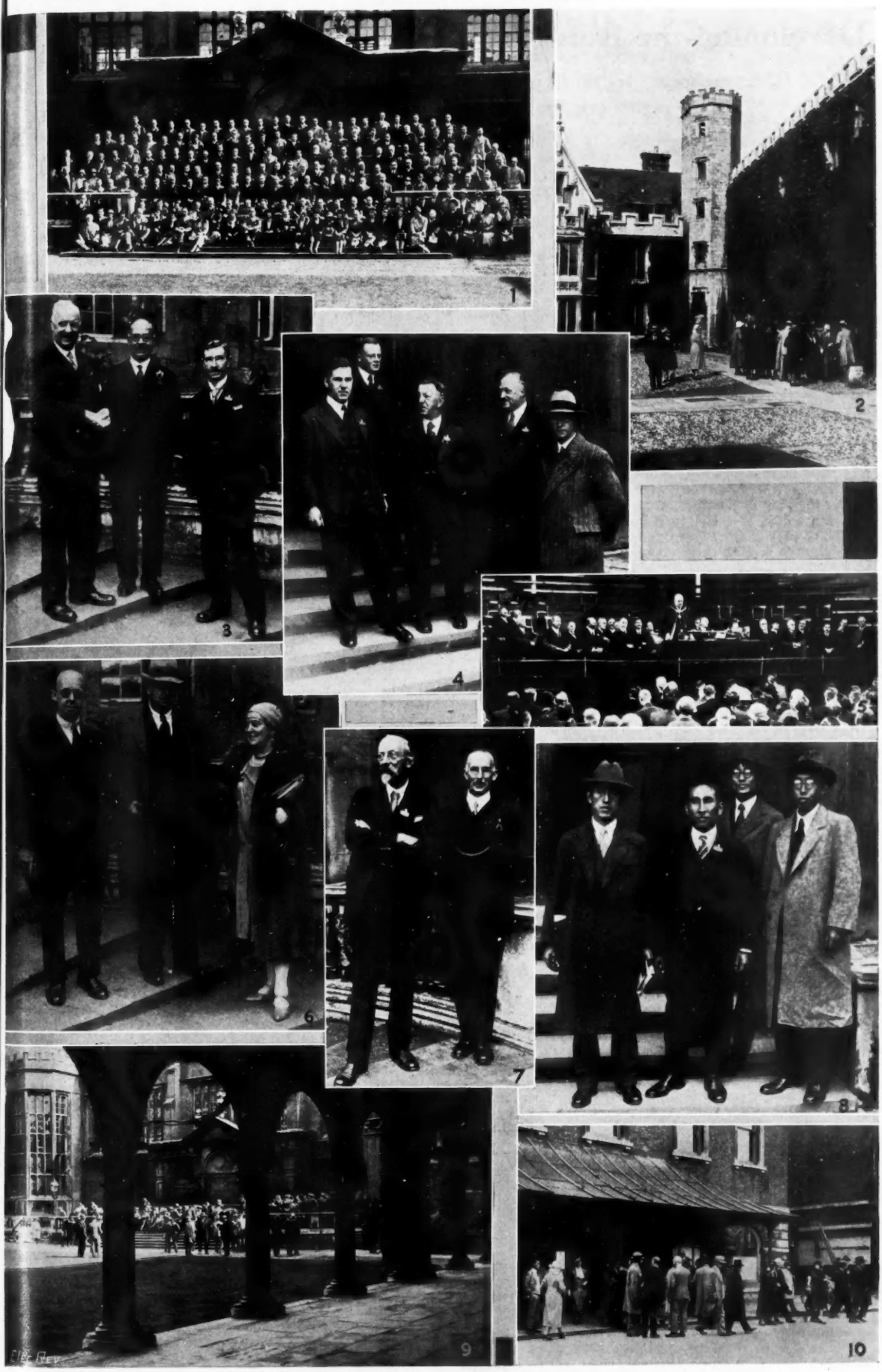
Two of the illustrations on page 419 show the Hackney Borough Council's electricity showrooms and office building illuminated in scarlet light in order to correspond as nearly as possible with the symbol on the several hundred advertising panels placed throughout the borough. The scarlet illumination is provided from two sources, namely: a neon tube sign comprising some 260 ft. of glass tubing, which is run along the main outlines of the building, superimposed upon which is a flood of scarlet light provided by a battery of 12 1,000-watt G.E.C. floodlight units. The church and grounds of St. John are powerfully illuminated by a battery of six 1,000-watt "Ediswan" long-throw projector units placed on the lawns in front of the church. The trees surrounding the ornamental gardens in front of the church are bathed in white light provided by a total of 20 1,000-watt "Ediswan" floodlighting units. The War Memorial is specially dealt with by four "Ediswan" floodlighting units, each containing a 500-watt lamp, making a total of 28 kW for this scheme. The results of the two schemes have been exceedingly successful, and crowds have congregated every evening to view the spectacle.

### Vehicle Head-lamps

This week something like 80 different suggested ways of defeating motor head-lamps dazzle are to be tested in public, for the Royal Automobile Club organised, in connection with the International Illumination Congress, an anti-dazzle demonstration at Cambridge, at which the best French, German, Dutch, American, and English devices were to be seen.

In several countries anti-dazzle lamps are already obligatory, and the British Ministry of Transport recently prepared draft regulations to the same end. At the R.A.C. demonstration it will be possible to compare the relative advantages of the flat-topped beam favoured on the Continent, the standard American lamp, and the movable beam now adopted on most British cars.

Besides the lamps designed to comply with actual or proposed regulations, the R.A.C. accepted entries from inventors who attack the dazzle problem in various novel and ingenious ways.



**International Illumination Congress Delegates Photographed at Cambridge**

(1 and 2) Delegates at Trinity College. (3) Messrs. S. H. Langlands, W. J. Auchterlonie and R. Watson. (4) Messrs. W. S. Stiles, T. E. Ritchie, J. Eck, E. Humble, and D. Wilman (at rear). (5) Civic Reception by Mayor (Coun. E. Jackson). (6) Messrs. W. M. Hampton, G. H. Stickney, and Mrs. O. Klapp. (7) Messrs. A. P. Trotter and C. C. Paterson (president). (8) Messrs. M. Imamura, M. Hoshiai, K. Mataja, and R. Tajinia (at rear). (9) Nevill Court, Trinity College. (10) Leaving the Guild Hall

# Developing the Rural Load. By R. Alan Thwaites, M.Inst.C.E., M.I.E.E.

## The prospect is that, within a very few years, quite half of our rural population will be able to enjoy the advantages of electricity

IN these days when large-scale operation is regarded as essential to economy in any industry, it is surprising to find that districts containing so few as 1,000 persons are still being supplied with electricity by separate undertakers.

There are, moreover, many non-statutory supply undertakings in existence, the operation of which is rendered valid by virtue of a proviso to Section 23 of the Electric Lighting Act, 1909. The marginal note to this Section is "Prohibiting non-authorised undertakers from competing with statutory undertakers," but there is a proviso which permits non-statutory supplies, provided the supply of electrical energy to consumers is not primarily the business of the supplier. The intention at the time was doubtless to permit a concern owning generating plant for its own purposes to supply a neighbour where no other supply was available. It will readily be appreciated, however, that it only requires the existence of a sufficiently large concern, such as a colliery company, to enable the entire purpose of this clause to be defeated by the carrying on of large-scale operations.

These non-statutory undertakings owe their prosperity mainly to their lack of obligations and their ability to select whom they will supply and whom they will not; in other words, they are at liberty to take the pick of the consumers in a convenient area and to leave the rest either without supply, or to be catered for by the statutory supply authority. The existence of both these classes of undertakings considerably hampers the development of electricity in the adjoining rural districts, and their absorption into larger undertakings is essential if such districts are to be supplied as a whole in the most economical manner and at the lowest possible price.

### Development Aided by Power Load

The availability of supply in country districts is expected to attract manufacturers from the towns into unrestricted areas, and this will greatly improve the financial aspects of electricity supply in such area.

Any form of pumping load is also a valuable aid, whether it be for pumping for drinking water, land drainage, sewage disposal, or irrigation. It is often overlooked that where low heads are concerned vast quantities of water can be pumped electrically at a small cost, and one has only to visit Holland to appreciate what may be done in this direction. No less than 120,000,000 gallons of water may be raised in 24 hours to a height of 3 feet by the use of 100 h.p., or, putting it another way, water to a depth of 1 inch can be removed from two acres of land and lifted 3 feet for the consumption of 1 kWh.

There are, therefore, no sound reasons why land should be allowed to lie water-logged or why certain areas of sandy non-retentive soil in this country should not be rendered more fertile by pumping, and the increased value should more than pay for the cost involved in pumping. Indeed, in California, about 80 per cent. of the total electricity generated is used for this purpose.

### Helping the Consumer

The importance of financing the consumer, and particularly the class of consumer generally met with in agricultural districts, is now recognised, and many schemes covering the hire and hire-purchase of apparatus are in operation. The demonstration of apparatus to prospective consumers in rural districts is seldom feasible through the medium of fixed showrooms. This is, therefore, usually accomplished by means of a travelling exhibition, which may be staged either in a specially-designed van, or in halls in the various villages.

Hundreds of villages which were formerly in complete darkness on moonless nights are now enjoying the advantages of electric street lighting, and dangerous cross-roads are being protected by the use of automatic signals, which supply undertakings are usually willing to provide and maintain for a few pounds per month.

### Planning Electrification Schemes

The usual practice is first to make a loading survey of each town and village in the area to be developed. In the case of large areas it may be that only the larger towns and villages which are to be dealt with first will be surveyed in detail.

A large village might be divided into various sections by means of letters, and the number of premises (P) to be served, and the estimated loading set out as in Table I. This will enable the low-voltage networks for the village to be designed and the cost estimated. It will also give an indication of the transformer capacity to be provided, and enable an estimate of revenue to be arrived at.

TABLE I.

| Section. | A - B. | | B - C. | | C - D. | | D - E. | | E - F. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | P. | kW. | P. | kW. | P. | kW. | P. | kW. | P. | kW. |
| Farms ... ... | 1 | 8 | — | — | — | — | 1 | 8 | 2 | 16 |
| Houses ... ... | 4 | 4 | 18 | 18 | 6 | 20 | 20 | 20 | 4 | 15 |
| Shops & Offices | — | — | 4 | 4 | — | — | 3 | 3 | — | — |
| Churches and Schools ... | 1 | 3 | — | — | — | — | 1 | 5 | — | — |
| Cinemas and Public Bldgs. | — | — | — | — | 1 | 5 | — | — | — | — |
| Hotels & Clubs | 1 | 5 | — | — | — | — | — | — | 1 | 4 |
| Garages & Works | 1 | 5 | — | — | — | — | 1 | 20 | — | — |
| Street Lighting and Traffic Signals ... | — | 1 | — | 1 | — | 1 | — | 1 | — | 2 |
| Allowance for Vacant Land | — | 10 | — | — | — | — | — | — | — | 10 |
| Total of Section | — | 36 | — | 23 | — | 26 | — | 57 | — | 47 |

Total connected load 10 years hence = 189 kW.

| Period. | Est. Con. Load. kW. | Est. Sim. Demand. kW. |
|---|---|---|
| First year ... ... ... | 60 | 15 |
| Third year ... ... ... | 120 | 30 |
| Tenth year ... ... ... | 189 | 45 |

Any villages which are not likely to be electrified in the early stages may be assumed to have a potential load on the basis of population, an allowance of 25 to 50 watts per head being an average figure according to the class of property in question. The high-voltage transmission system can now be designed and the cost estimated.

An analysis is then made and tabulated, with the inclusion of estimates of capital charges and working costs. It is then possible to arrive at an estimate of the date by which the scheme may be expected to yield an adequate return on the expenditure.

Notwithstanding the heavy burden of rates and taxes, and the existence of necessary restrictions, the prospects are that within the next few years 50 per cent. of the rural population may expect to have a supply of electricity available.

# Next Week's Celebrations

## Faraday Centenary—I.E.E.—B.A.

IN connection with the Faraday Centenary celebrations which commence next week, the Royal Institution and the Institution of Electrical Engineers have arranged a comprehensive programme, the principal events of which are as follows:—

**Royal Institution.**—On Monday afternoon delegates from the Colonies, Dominions, and foreign countries will be received, and in the evening a commemoration meeting will be held at the Queen's Hall, London.

**Institution of Electrical Engineers.**—The annual summer meeting will open with a conference at Kingsway Hall, on Tuesday morning, at which four discourses will be delivered. In the afternoon alternative visits have been arranged to various works in and around London, concluding with the annual conversazione in the evening at the Albert Hall. On Wednesday morning there will be a private view of the Faraday Exhibition at the Albert Hall, prior to its inauguration in the afternoon by Lt.-Gen. J. C. Smuts. The arrangements for Thursday and Friday include more visits to works and other places of interest, and on Friday evening there will be a reception by the President (Mr. C. C. Paterson) and Mrs. Paterson, followed by a dance and supper.

**British Association.**—The Centenary meeting will be held at the Royal Albert Hall on Wednesday afternoon, and Lt.-Gen. J. C. Smuts will deliver his presidential address in the evening at the Central Hall, Westminster.

Other events during the week are a garden party at the National Physical Laboratory on Thursday afternoon, the Royal Society soirée at Burlington House on Thursday evening, and a Faraday Centenary dinner at the Dorchester Hotel, given by the Government, to delegates and guests (for timetable see Forthcoming Events).

# Electricity in Majorca. By D. J. Bolton

## Some holiday reflections on a Mediterranean Island

THE English holiday maker who travels in out-of-the-way places will often find that his only acquaintance with electric lighting occurs in his pocket flash lamp; this, however helpful for occasional illumination, is hardly a substitute for the all-electric household. They are said to order these things better abroad, and certainly, so far as a personal experience is valid, the evidence of some half-dozen Continental tours (including tramps with rucksac to some very remote places) is that electric lighting is all but universal. This has been particularly noticeable in Majorca, from which I have just returned after a three-weeks' stay.

Majorca is a Mediterranean island about the size of Cornwall; its rainfall is half that of London, and, as most of it occurs during the first few months of the year, practically every stream bed is a channel of dry boulders before the summer is out. Moreover there are no glaciers or snow-capped peaks to feed its springs or provide water power during the dry season. Add to this the fact that fuel is scarce and the population mainly agricultural, and it will be seen that Majorca is the last place in which to expect extensive power developments. Yet so far as lighting is concerned the island would appear to be almost one hundred per cent. electrified.

The typical Majorcan house is built round a central courtyard or patio, which can usually be seen and entered from the street through a porch or wide-open door. This is the core and focus of the whole household; it

**An Early "Pony Motor"**

led to believe that the natives have discovered a method of distilling it from the sunshine, of which there is an inordinate amount! An interesting feature of the Lluch monastery is that no charge is made for staying there. On arrival, one reports to the attendant of the apartments, who deals out a set of linen and apportions one a cell. The monastery itself is so endowed that any wayfarer may stay for three nights without charge, the only stipulation (on the doors of the apartments) being that those who repose therein should "sleep without sin."

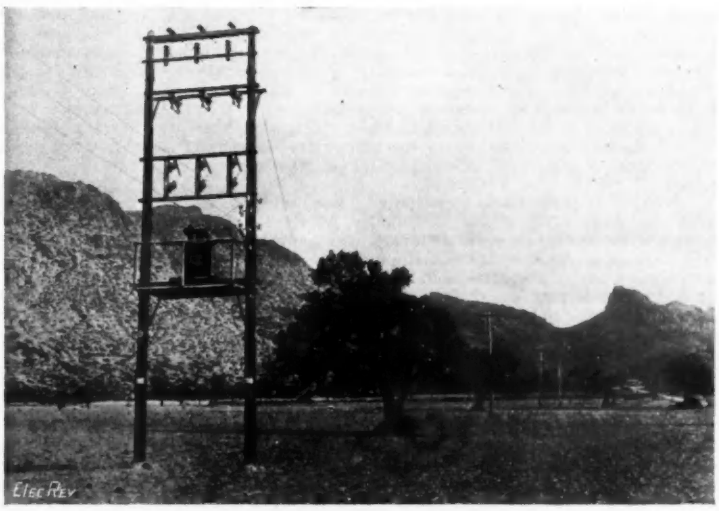
Meals, which are taken in the refectory, must, of course, be paid for, but even so, at the present rate of exchange, it is possible to live there fairly luxuriously for half-a-crown a day. Another peculiarity about the Lluch monastery is that it appears to be the last stronghold of Catalonia. Whether it was the spirit of the revolution or just natural perversity one cannot say, but it seemed almost a matter of principle with the refectory attendants to understand not a word of English or French and hardly a word of Spanish. To get food it was necessary either to make signs or else to talk Catalan. We adopted the former as being the easier course, and we were even reduced to sketching articles of food on a piece of paper. On leaving next morning we wanted to pack some lunch, so sketched an egg in an egg-cup and told them in Spanish how many minutes to boil it. Even then they tried to pack up egg-cups as shown in the sketch as well as eggs!

**The Modern Equivalent for Pumping**

may contain a well, always some palms or other plants in pots, and often a handsome staircase leading to the upper floors. In the smaller houses it may be just a large central room open at front and back. It is here that the family forgathers in the cool of the evening to discuss the day's affairs or to carry on the ubiquitous needlework. In strolling around the towns after nightfall we thus had glimpses into a large number of Majorcan households, and during our whole stay we saw only one of these interiors which was not electrically lit. The illustration on page 424 indicates the delightful architecture to be seen in the larger courtyards, and it will be noticed how well the neat electrical fitting harmonises with its less modern surroundings.

One of our excursions was to the monastery of Lluch. To reach this we were called at 3.30 a.m. and tramped up with a guide and a mule, the latter carrying our packs and (occasionally) ourselves in turns. (The early start is necessary because of the extreme heat of midday.) Yet when we reached this lonely retreat we found that every "cell" of the monastery had its electric light complete with bed switch. How the supply gets there we never discovered, as we saw not the slightest trace of either generating or transmitting gear. I am almost

It was said above that there is little or no water power on the island, but the matter can be put more strongly, for in




**Overhead Distribution System in Majorca**

**An Electrically Lighted Courtyard**

this case hydraulics absorb power instead of furnishing it. To a summer visitor it might almost appear that the principal occupation consists in pumping water up from big holes in the ground, and letting it flow back again via the fields and the houses. Power is therefore needed, and this is supplied for the most part by animal labour. One of the accompanying illustrations shows a primitive "pony motor," consisting of a horizontal wooden cage with a central pole to which the animal is harnessed. The bars of this cage engage with the wooden teeth of a vertical chain wheel carrying an endless metal chain. Earthenware pots are fixed to the chain and as its lower end dips down into the well, water is brought up to the surface where it runs into the fields and irrigation channels. Another photograph shows the modern equivalent, which unfortunately has none of the picturesqueness of the other. A minute centrifugal pump driven by an electric motor can just be seen in the brickwork on the right, and this is made automatic by a simple and ingenious arrangement of floats and string attached to the switch handle. The supply comes by the three overhead wires seen above on the right.

Majorcans, like other Spanish peoples, have at times been accused of laziness, and it is said that their three favourite words are "siesta," "mañana" (to-morrow) and "fiesta." But judged by their engineering works—roads and the like—they have some very fine performances to their credit, whilst in matters electrical their overhead transmission system, although on the simplest possible plan, certainly succeeds in "delivering the goods" to a very large proportion of the island. Incidentally, in the matter of fiestas there is much to be said for a very simple distribution system. Rumour credits them with averaging two holidays a week, and although this is an exaggeration, there is no doubt that the business of putting up decorations and taking them down again must go far to prevent unemployment. But when it is a matter of lighting a row of coloured lamps, what could be simpler than to hook the leads on to the nearest overhead cable? The question of who pays for the electricity thus consumed is one that seems never to have occurred, much less solved.

It must be realised finally that Majorca is not primarily a tourist centre, and almost all the inhabitants get their living through agriculture or local industries. Electricity here is not a luxury imported to gratify the wealthy tourist but is a part of the everyday life of the peasant and worker. The cool evening hours, so precious in a sub-tropical climate, can be used to the full when electricity is everywhere on tap. The English farmer, even when he employs the most up-to-date agricultural machinery, too often in the evening must pore over an oil lamp; a Majorcan farmer, on the other hand, may be found using a wooden plough during the day and yet having electric light in his house at night time. Many of his implements and methods are a thousand years old, but in one respect at least he is up-to-date.

# Tramway Regeneration

## Tests being carried out at Manchester and Glasgow

THEORETICALLY there is more scope for the application of regeneration to tramcars than to electric railways, because approximately 45 per cent. of the total energy absorbed in operating the car is wasted in stopping the car again; in addition, the kinetic energy of the car ordinarily is converted into attrition of braking surfaces, which must be renewed from time to time at considerable expense. The reasons which have operated in the past against the extended use of regeneration on tramcars are mainly the practical difficulties of its application, as many schemes which have so far been tried involve additional complications to the control system, a departure from the robust series motor, and in some cases other additional rotating apparatus.

In general, the cost of power for propelling a tramcar is approximately 15 per cent. of the total operating costs. A reduction of 25 per cent. in power consumption therefore would mean an economy in the total operating costs of 3.75 per cent. However, if regeneration adversely affected the schedule speed of the car, even by about 7.5 per cent., much of the economy gained by the saving of power would be wiped out by the reduced earning capacity of the car. If, in addition to the loss of revenue-earning power of a tramcar due to its lower speed and therefore lower mileage per annum, there were a loss of passengers to competitive vehicles of a higher speed the adverse balance would be still more accentuated.

This point is particularly important in view of the growing tendency towards higher speeds. Actually, for the same energy consumption, a higher schedule speed can be obtained with suitable regenerative equipment than with the present standard equipment. The increase in traffic on city and suburban roads makes it very difficult to obtain a high schedule by merely increasing the free running speed of the vehicle, because (owing to frequent checks on the road) a vehicle must drop in speed and pick up again at high rates of retardation and acceleration if a high average is to be maintained. With the ordinary type of tramcar this becomes extremely expensive in current, particularly as the energy loss depends upon the square of the maximum speed at which braking is applied.

With regenerative equipment, however, the maximum speed of the car at which braking is applied scarcely affects the current consumption, since the extra energy put into the car to attain the higher speed, apart from losses, is fed back to the line. Moreover, the non-regenerative tramcar has only two economical speeds, whereas the Manchester regenerative car has eight, and therefore a suitable speed may be found for any traffic requirements without the use of resistances and with the avoidance of snatching, or inching, the controller.

Control which embodies the customary grouping of motors in series and in parallel, both for motoring and regenerating, appears to be a better solution of the problem than any scheme, however simple, which embodies only one of those motor groupings, particularly in this country, where modern motors are of the comparatively light and high-speed type. Therefore, the additional demand on the motors must have first consideration; in English practice no appreciable increase in gear ratio is possible, but conversion in many cases is made possible by the fact that the capacity of the motor has a margin over its present requirements, particularly single-truck motors.

Following the visit of the Municipal Tramways and Transport Association to Paris, the Association decided to convert a car for experimental purposes on the Manchester Corporation system, and the Glasgow Corporation also decided to make a trial on its own system, the series-parallel scheme being selected in both cases. The Glasgow test results are not yet available, but some of those obtained in Manchester with "Metrovick" equipment are described in a paper which Mr. G. H. Fletcher, M.I.E.E., read at the annual meeting (managers' section) of the Association at Manchester on September 10th and 11th.

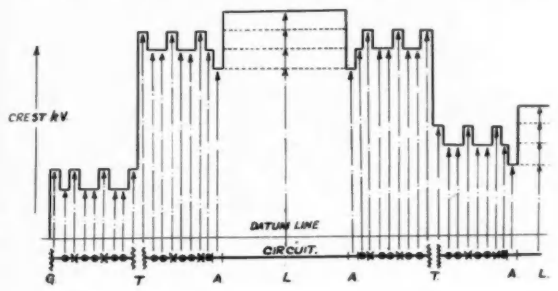
## A Swedish Totalisator

A new type of mechanical totalisator has been placed on the world's markets by the L. M. Ericsson Telephone Company. Beyond the action of pressing a key on the ticket-issuing machine when the bet is made, no manual work has to be performed, and the totalisator registers all bets, simultaneously giving the increasing total on each horse running, as the bets are accepted; a ticket cannot be issued until the final bet has been recorded on the totalising equipment. The equipment has been approved by the British Race Course Betting Control Board, and consists primarily of standard relays and rotary line switches similar to those used in automatic telephone exchanges in England.

# System Insulation Strengths. By S. Austen Stigant, M.I.E.E.

## An introduction to the study of the co-ordination of the insulation strengths of electrical transmission systems

INSULATION failures are occasioned by very high voltage disturbances which partly possess the characteristics associated with high-frequency waves. These disturbances, which are transient in nature, are not necessarily true high-frequency phenomena and, in fact, apart from those set up by arcing grounds and occasionally by switching, they are more often unidirectional. They are generally characterised by a sharply-rising steep front and a gradually-falling sloping tail, and are usually referred to as impulses. As extra-high voltage transmission is more commonly effected by overhead lines, the most onerous conditions which have to be legislated for in proportioning the system insulation strengths are those arising from natural lightning discharges. The wave characteristics of these discharges vary considerably and depend, among other things, upon the height of the transmission line above ground, the height of the cloud above ground, the length of the cloud



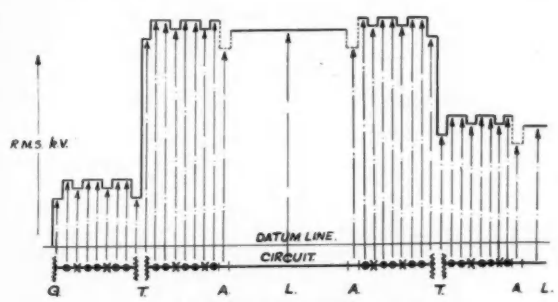




**Fig. 1.—Co-ordinated Impulse Strengths**

**Fig. 2.—One-minute Dry-test Pressures at 50 Cycles**

G=Generator windings; T=Transformer windings; A="Adjacent" line; L=Line; X=Circuit breakers; ● =Bushings

over and paralleling the line, the type of cloud discharge, and the time taken by the cloud to discharge its accumulated electrical energy. From oscillograms of the disturbances set up on high voltage transmission lines by natural lightning discharges, it has been found that the wave impulses reach maximum values in times ranging from about 2 to 9 microseconds or more; tail lengths to 50 per cent. of the crest value range from 6 to 40 microseconds equivalent time length, while total time lengths in which the impulses reach zero vary from 10 to 160 microseconds. These are typical representative values and, of course, other values outside these ranges have been obtained, but they are sufficient to show the general characteristics of the impulses arising from natural lightning discharges. Induced crest voltages as high as 2,800 kV have been measured, while measurements made of direct-stroke phenomena have indicated lightning currents of 160 kA.

### Maximum Insulation Efficiency

As insulation failures occur generally at times when high-magnitude transient voltages are present in the system, the relative and absolute electric strengths of the insulation of different components of the system should be proportioned upon the basis of their ultimate strengths under conditions corresponding to the most onerous transient conditions likely to be encountered. In other words, in order to obtain maximum overall insulation efficiency the insulation strengths should be based upon breakdown values at impulsive excitation and not merely at normal operating frequency excitation.

On account of the high rate of voltage increase of steep-fronted waves, the instantaneous impulsive breakdown of insulation (both flashover and puncture) is considerably higher than the normal 50-cycle breakdown. The ratio of crest impulse breakdown to crest 50-cycle breakdown is called the impulse ratio. That is, on the basis of a sine-wave 50-cycle excitation, impulse ratio=crest-impulse breakdown/r.m.s. 50-cycle breakdown×1.41.

For a single-impulse wave which reaches its crest in 0.5 microseconds and which subsequently falls to half the crest value in 5 microseconds, the following impulse ratios may be taken as representing typical averages: Suspension line insulators, 1.8; transformer and switchgear bushings, 2.4; transformer windings (excluding bushings), 2.6; oil circuit breakers (excluding bushings), 2.4; alternators, 2.4.

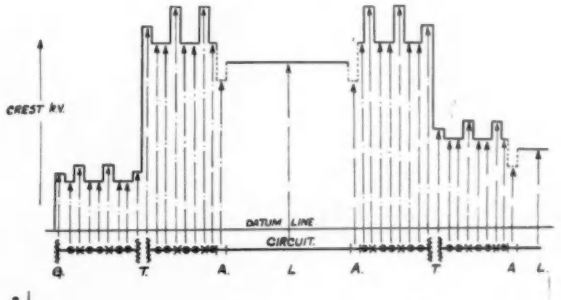
**Mr. S. Austen Stigant is well known as an authority on transformer design and as a writer on electro-technical subjects**

Consideration of impulse voltage strengths of the insulation components is the first step in the plan of co-ordination. The second one is to decide how the relative strengths should be graded in order to impart maximum insulation efficiency to the system as a whole. It has been laid down that the insulation strengths of the component parts of a system under impulsive stresses should be in the following descending order of magnitude; transformer windings and circuit breakers (internal parts), transformer and circuit-breaker bushings, "adjacent" line insulation. The impulsive strength of the main line insulation may be as high as is economically possible so long as adequate protection is afforded the transforming and control apparatus at the ends of the line by means of suitably proportioned lightning arrestors or discharge gaps, reduced lengths of line-insulator strings, or increased overhead earth-wire protection. Lightning arrestors or discharge gaps should be located immediately adjacent to the transformers, while the reduced length insulator strings or added earth wires should be extended for a distance of not less than half a mile from the transformer.

### Grading of Insulation Strength

Fig. 1 shows the application of this principle of relative grading of insulation impulsive strengths to a typical hypothetical system where the line insulation is sufficiently high to prevent sparkover under the worst possible conditions of lightning discharge. The function of the "adjacent" line insulation or what has been called the "weak link" is to protect the terminal apparatus and at the same time to confine sparkovers to regions where possible damage can easily and quickly be located and repaired. The links are "weak" only in relation to the insulation of those parts of the system on either side of them and not in absolute terms.

As it is not expedient to subject all apparatus (particularly transformers and machines) to impulsive voltage tests, it is



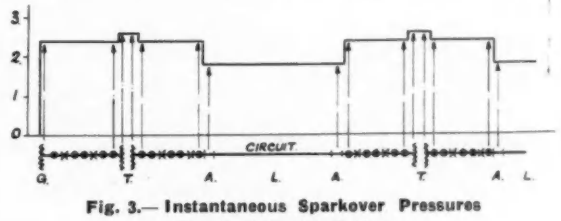




**Fig. 3.— Instantaneous Sparkover Pressures**

**Fig. 4.—Impulse Ratios**

desirable to express the system insulation co-ordination in terms of related normal 50-cycle one-minute dry tests. Fig. 2 shows the relative magnitudes of these tests for the hypothetical system already referred to. The proportions are in accordance with modern practice, as laid down in the various

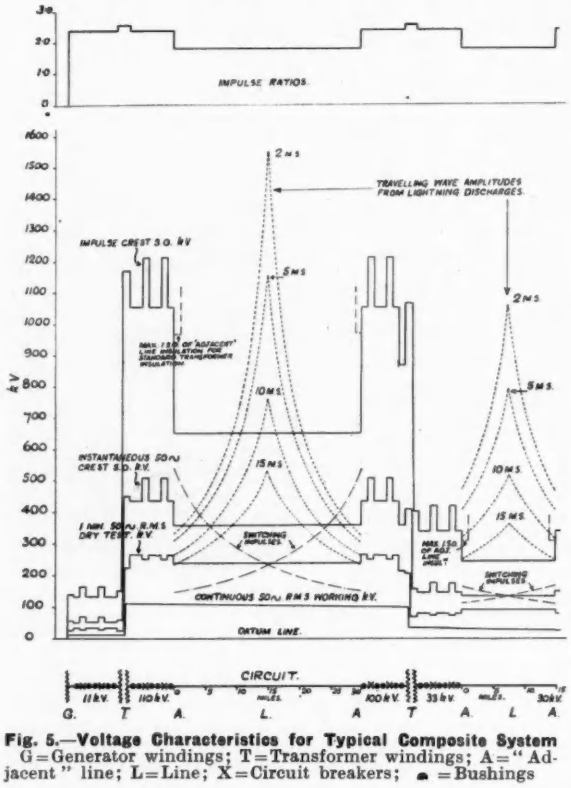

IMPULSE RATIOS
TRAVELLING WAVE AMPLITUDES FROM LIGHTNING DISCHARGES.
IMPULSE CREST S.O. kV
INSTANTANEOUS 50~ CREST S.O. kV.
1 MIN. 50~ R.M.S. DRY TEST. kV.
SWITCHING IMPULSES.
CONTINUOUS 50~ R.M.S. WORKING kV.
DATUM LINE.
kV
CIRCUIT.
G. T A. L. A T A. L A.

**Fig. 5.—Voltage Characteristics for Typical Composite System**
G=Generator windings; T=Transformer windings; A="Adjacent" line; L=Line; X=Circuit breakers; ● =Bushings

specifications issued by the British Enginering Standards Association. (Transformers, B.S.S. 171-1927. Overhead line insulators, B.S.S. 137-1930. Oil circuit breakers, B.S.S. 116-1929. Bushing insulators, B.S.S. 223-1931. Alternators, B.S.S. 169-1925, 225-1925, 226-1925.) The provisions for "adjacent" line insulation are shown dotted as the B.E.S.A. Specification B.S.S. 137-1930, while recognising the principle, does not propose actual values. In respect of transformers and machines the chart corresponds more closely with the (2E+1) kV test, but the principle is of general application. Charts of typical relative 50-cycle instantaneous breakdown voltages and impulse ratios are reproduced as figs. 3 and 4.

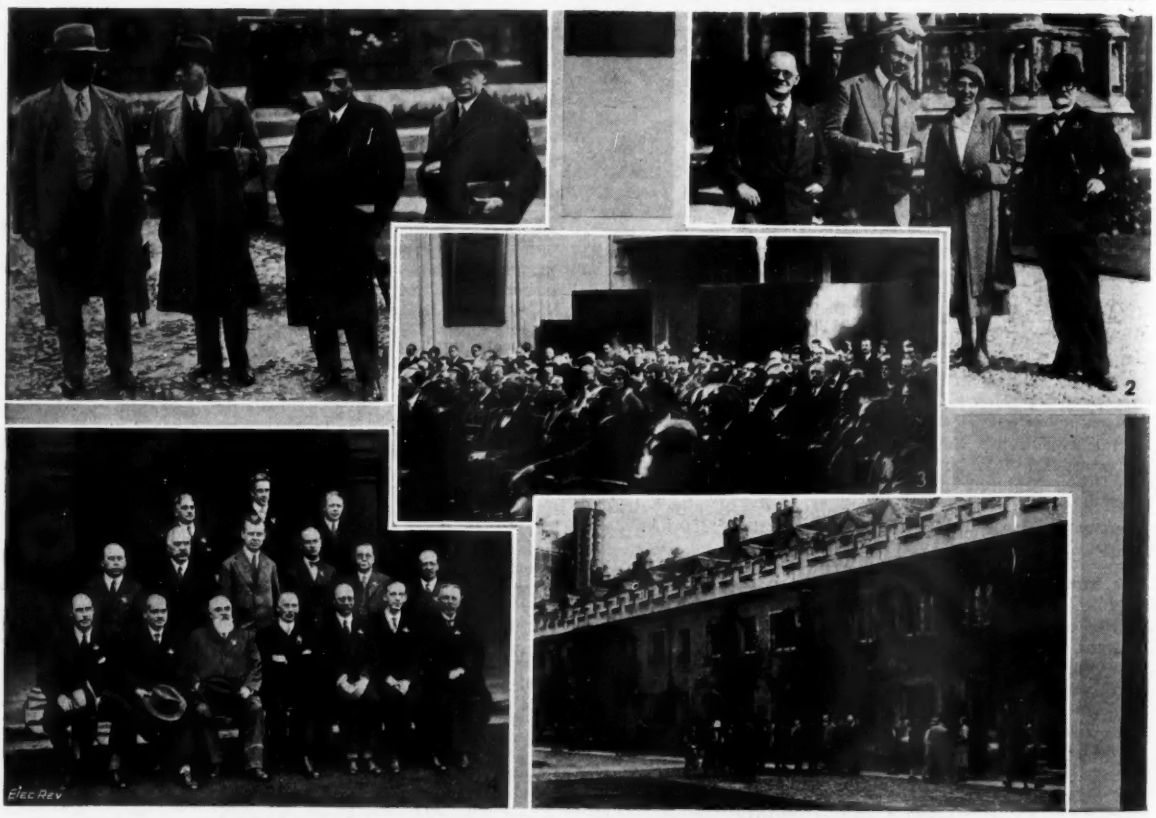
The relationship between the one minute, 50-cycle, dry r.m.s. test pressure and the crest impulse sparkover is given by the following expression:—

Impulse sparkover=1 min. dry test×F×1.41×IR, where
F=factor connecting 1 min. 50-cycle dry r.m.s. test pressure with instantaneous 50-cycle dry r.m.s. sparkover.
IR=impulse ratio.

For line insulators and bushings, minimum values for F for different system voltages may be obtained from the B.E.S.A. specifications already referred to. For machines, transformers and switchgear, F varies according to the size and voltage of the apparatus. In the case of fig. 5 next referred to, the following values were taken:—

| | |
|---|---|
| 11-kV generator windings, transformer windings and switchgear ... ... ... ... ... ... | 1.8 |
| 110- and 100-kV transformer windings and switchgear ... ... ... ... ... ... ... | 1.44 |
| 33-kV transformer windings and switchgear ... | 1.62 |

Fig. 5 shows the voltage characteristics of a typical 11-110-33 kV composite system, according to data available in B.E.S.A. specifications and in or derived from papers published elsewhere on the subject. It will be noticed from this chart that the standard of line insulator impulsive sparkover in this case is low compared to that of the remaining parts of the system. The impulse sparkover is based upon the dry sparkover at 50 cycles given in B.S.S. 137-1930, which is a *minimum* value, and while the dry sparkover given in B.S.S. 223-1931 for the bushings is also a *minimum*, it is competent to raise the value for the former in the design of a given line without reference to the latter so long as the terminal apparatus is safeguarded by the inclusion of a properly proportioned adjacent line insulation. In the particular instance illustrated, the impulse sparkover of the adjacent line insulation could be as high as 965 kV without introducing the risk of throwing undue stresses upon the terminal apparatus.




**Delegates to the International Congress on Illumination at Cambridge**

(1) Messrs. K. Titsch, H. Schlögl, E. Fried and F. Sedlak. (2) Sir Francis Goodenough, Mr. and Mrs. N. A. Halbertsma, and Mr. J. Leichmüller. (3) Official Address of Welcome. (4) The President and National Representatives. (5) Arrivals for Morning Session

# Mobile Railway Sub-stations

## Truck-mounted mercury-vapour rectifying outfits for the Italian State Railways

ALTHOUGH the Italian State Railway authorities have electrified a number of sections in Northern Italy on the three-phase 16⅔-cycle system, in Southern Italy direct current at 3,000-V contact-wire pressure was chosen for the Benevento-Foggia and other lines.

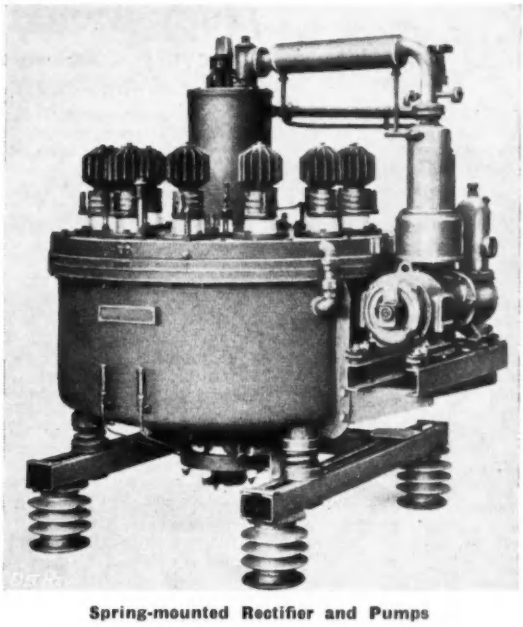
Mercury-vapour rectifiers will be used exclusively as convertors for the d.c. sections. The sub-stations are to be equipped with 2,000-kW sets. The average distance between the sub-stations, which are to be provided with from two to four rectifier sets each, will be about 15½ miles.

The three-phase electrified sections have been equipped with a number of travelling sub-stations to increase the output of the convertors and reduce the number of stand-by sets. Their satisfactory operation has induced the State Railway authorities to provide similar sub-stations for the d.c. lines, and an order was placed with the Societa Tecnomasio Italiana Brown Boveri, of Milan, for complete equipment for two travelling rectifier sub-stations for use on the Bologna-Pratodi-Toscana (Florence) line, one of which is illustrated herewith.

The electrical equipment comprises a rectifier transformer of special design with natural cooling for connection to a 60-kV 45-cycle supply; a 2,000-kW, 2,900-V, d.c. rectifier designed for a 20 per cent. overload capacity for two hours, 50 per cent. for one hour, and 100 per cent. for two minutes; and a combined rectifier and vacuum pump closed-circuit cooling set. The h.v. apparatus and the rectifier transformer are of the outdoor type, while the rectifier, the cooling set, and the d.c. apparatus are mounted in a cabin on the truck.

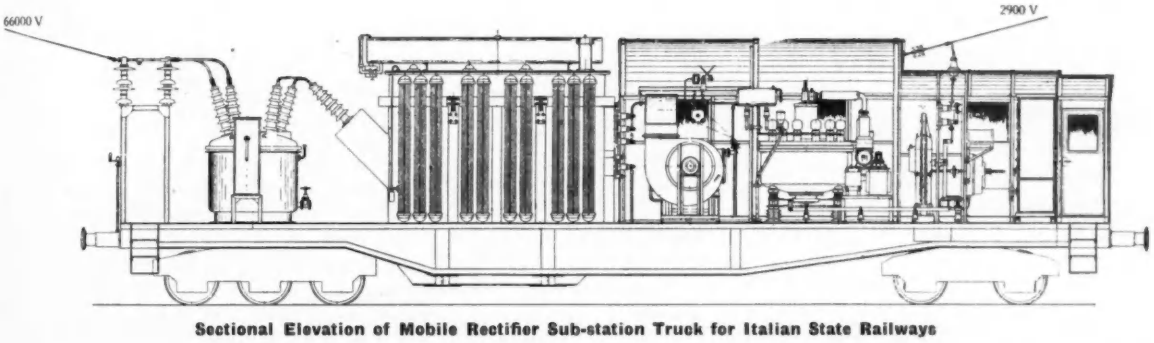
The rectifier is fitted with a two-stage vacuum pump outfit; the cylinder and pump are built in unit form in order to prevent leakages from vacuum pipes and to damp out any vibration of the cylinder during transport. It is mounted on springs.

A supply at 120-V, 45 cycles, is required for feeding the various auxiliary appliances, such as the ignition and excitation device, the air pump, and the cooling set; no space being available for the auxiliary transformer on the truck itself, when the plant is being used near a permanent sub-station the current for the auxiliary apparatus is drawn from the latter, in which case the rectifier works entirely automatically. Otherwise the auxiliary services are fed from the secondary side of the rectifier transformer, in which case automatic operation is confined to the d.c. side, the input breaker being closed by hand.

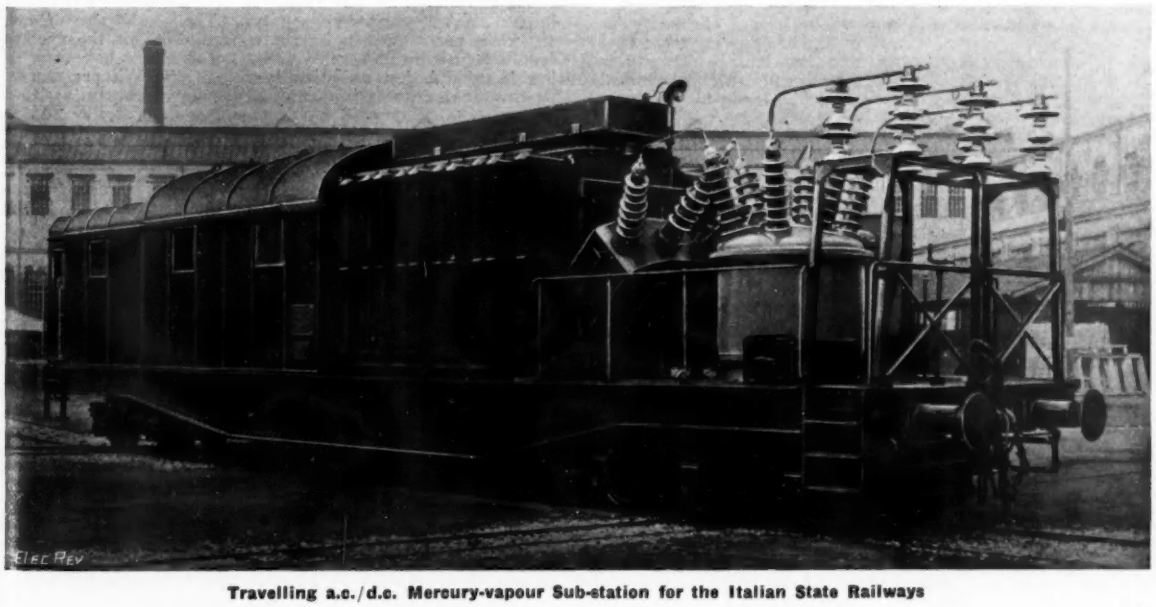


Spring-mounted Rectifier and Pumps

The general details of the machines are: length over buffers 55ft. 5in., maximum height at transformer 14ft., overall width 9ft. 9½in., distance between bogie centres 37ft., wheel diameter 33.45in., approximate weight of truck without electrical equipment 29 tons, approximate weight of electrical plant 45 tons, approximate total weight 74 tons, approximate axle load 15 tons. The railway authorities have decided that the machines must not travel at a greater speed than 25 kilometres (about 15½ miles) per hour.




Sectional Elevation of Mobile Rectifier Sub-station Truck for Italian State Railways




Travelling a.c./d.c. Mercury-vapour Sub-station for the Italian State Railways

# Domestic Hot-water Service

## An essential need of every household, and of each member of it, is hot water at any time and in any season

AS hot water is needed just as much in the summer as in the winter the utility of the kitchen range in this respect is greatly reduced. Considerations of cleanliness, convenience, safety, continuity of supply, etc., frequently outweigh possible disadvantages of a cost higher than that obtainable with other methods.

It should appeal to the supply authority, as it meets a public need, and enables many additional kWh to be sold largely, or entirely, off-peak. Some particulars of electric water heating development in Canada have been given by Mr. A. S. L. Barnes, general laboratory engineer, Hydro-electric Power Commission, of Ontario, in a paper read to the Association of Municipal Electricity Utilities at Ottawa. He relates that in Ontario the average monthly kWh consumption per consumer has increased from 80 in 1924 to well over 100 to-day, but much of the demand is for short-hour use and is by no means entirely off-peak.

Investigations in 255 towns and villages in Canada show that the average monthly kWh per consumer is less than 40 in 40 per cent. of the cases considered, and less than 100 in 84 per cent. Towns with populations exceeding 10,000 give better figures, nearly 100 kWh per month in 71 per cent. of the cases, and nearly 200 kWh per month in 87 per cent.

As the average consumption for domestic water heating is 400 kWh per month, its advantages as a load builder are obvious. The estimated number of water heaters in use in Ontario at the end of 1929 was over 38,000, with an installed capacity of 57,200 kW—about 1,500 W per heater, which indicates that a large proportion is operated intermittently, many being of 3,000 W capacity. The number of domestic consumers connected to the Hydro company's system at the end of 1929 was more than 415,000, of which 40,000 had electric water heaters.

Assuming 600-W heaters, operated continuously, to be capable of supplying the hot-water requirements of all the domestic consumers, the total demand would be 225,000 kW with an annual consumption of almost 2,000 million kWh, but the present rate of growth is less than 2 per cent. per annum of the number of consumers.

The water-heater consumption will be almost the same whether a small-capacity heater be operated for many hours or a large capacity one for a shorter total period. With a well-lagged system, one kWh will supply about 2.6 gal. at 160 deg. F.; with an initial temperature of 50 deg. F. a family of three or four persons can obtain all the hot water it reasonably requires (36 gals.) from a 600-W heater operated continuously.

Three types of heaters are in common use: (1) immersion, (2) circulating, and (3) clamp-on. The latter has three advantages not possessed in the same degree by the others: (a) it can be easily installed or removed; (b) it can be placed at any level; and (c) one heater can be fitted high up the tank for the quick heating of small quantities of water, while another can be placed lower down to furnish a larger supply. It is doubtful, however, whether it is as efficient as the others with the same temperature and heat insulation conditions.

### Intermittent Heaters

Water-heaters in use to-day in the average home range from 600 to 5,000 W, with storage capacities of from 10 to 30 gallons. The character of intermittent operation can be varied within wide limits by altering the amount of storage provided, which gives it a flexibility unequalled by any other domestic appliance.

Intermittent heating with unrestricted use of electricity involves the use of a heater with a higher capacity than that required for continuous heating but less storage capacity is required; thermostatic control is essential for economical working. The demand will frequently be made at the peak, and a case has been recorded in England in which, with thermostatic control, there were only 20 days out of 182 days when the heater did not come on on the peak.

For keeping water heaters off the peak time switches are extensively used in Europe. Synchronous motor switches are also employed, but Mr. Barnes recommends control direct from a station or sub-station. This may be accomplished by a pilot wire to each consumer's premises, which is somewhat expensive. Carrier-current control is being used in the Isle of Man; the method should prove satisfactory if the price of the necessary equipment can be made reasonably low. Control by radio is a possibility, but not much work has yet been carried out in this direction.

### Heat Insulation

Heat losses are of three kinds, radiation from the tank, radiation from the pipes, and conduction along all the pipes and along the water contained in them. Conduction cannot be conveniently reduced, but it is essential to provide adequate insulation on the tank and on the pipes leading therefrom. With the temperatures usually employed it is not necessary to have more than about 2in. of hair felt, or its equivalent in other materials; the difference in effect between 2in. and 3in. of hair felt is so small that the cost of increasing the insulation is not justified, as tests carried out by the Hydro-electric Power Commission indicate (see Table I).

TABLE I.

| Insulation Thickness (inches) | Radiation loss (Watts) | Difference (Watts) |
|---|---|---|
| 0.5 | 525 | — |
| 1.0 | 375 | 150 |
| 2.0 | 300 | 75 |
| 3.0 | 275 | 25 |

Since radiation losses are dependent upon the difference of temperature between the radiating surface and the surrounding air, and increase very rapidly with increase of this difference (unless very small), it is desirable to have thermostatic control to prevent the temperature of the water exceeding what is necessary. Such control must be set for the lowest temperature that will satisfy a consumer's requirements (from 140 to 180 deg. F.). Keeping down the temperature will also minimise scale formation due to hard water. In many cases 160 deg. F. is suitable, and if 180 deg. is exceeded scale formation becomes serious and reduces the efficiency of the heating system.

### Articles on Water Heating

The E.D.A. Report No. 867 should, of course, be in the hands of all our readers interested in water-heater development. The following articles which have appeared in the ELECTRICAL REVIEW are a small selection of those that have dealt with various aspects of the subject:—

"The Domestic Storage of Energy" (L. G. A. Sims), October 21st and November 4th, 1927; "Electric Water-heating" (M. O. F. England), March 22nd, 1929; "Problems of the Peak" (C. S. Davidson), August 16th, 1929; "My Electric House" (R. H. Rawll), August 16th, 1929. "Thermal-storage Water Heaters" (L. G. A. Sims), September 13th, 1929; "Electric Heating" (R. A. S. Thwaites), February 28th, 1930; "Domestic Water Heating," June 13th, 1930; "Electricity for the Home" (W. R. Conly), June 20th and 27th, 1930; "Electric Water-heating" (E. Eaves), October 17th, 1930; "An Engineer's Outlook" (A. L. Lunn), November 7th, 1930; "Domestic Water Heating" ("Consumers Engineer"), May 22nd and August 21st, 1931; "Converting Water Systems" ("Consumers' Engineer"), August 28th, 1931.

### Some American Experiences

Statistics regarding the development of domestic water heating in America have appeared from time to time in the *Electrical World*. The following table relates to the undertaking of the Detroit Edison Co.

| Appliance. | kWh per annum. | Load factor per cent. |
|---|---|---|
| Lighting ... ... ... | 540 | 38 |
| Oil-burner ... ... ... | 258 | 65 |
| Refrigerator ... ... ... | 542 | 87 |
| Cooker ... ... ... | 1,480 | 28 |
| Water-heater ... ... ... | 2,825 | 56 |

Water storage capacities ranged from 8.3 to 50 gal., the average being 20 gal., indicating that most of the heaters were operated intermittently. Due, probably, to the higher cost of electricity in Detroit, all consumptions in the table, and particularly those of the water heater, are low compared with Ontario standards.

A 2½ months' test of a 20-gal. tank insulated with mineral wool and using a 3-kW immersion heater (185, 155 and 135 deg. F.) shows that a heater can be added to an electric-cooker installation without increasing the fixed charges on the power station, and that frequent operation of the water heater gives greater diversity. The test also shows 300 kWh per month to be the consumption for the average family, which in most cases would get sufficient hot water on low heat, and that radiation losses are 45 kWh per month, proving that automatic operation is more economical than manual. A cooker of 8 kW makes a m.d. of 5 kW and an average demand of 3½ kW. The cooker and water-heater loads overlap not more than 50 times per annum for about ten minutes as an average.

The Ohio Edison Co. gives the following results for ten families, the tariff being 0.75d. for the first 100 kWh per month and 0.5d. for all additional:—

| | Average. | Maximum. | Minimum. |
|---|---|---|---|
| Tank capacity, gal. ... | 76 | 120 | 40 |
| KWh per month ... | 265 | 438 | 114 |
| Gal. per month ... | 928 | 1,530 | 400 |
| Cost per month ... ... | 21s. | 18s. | 6s. 10d. |

In the U.S.A. 80 undertakings are considering the adoption of a rate of 0.5d. per kWh, or less, for domestic heating and water heating.

With well-insulated tanks the monthly efficiency at the tank outlet may be as high as 93 per cent., and pipe losses are considerably higher than tank losses. The temperature variation at the tank outlet need not exceed plus or minus 10 deg. F. during the entire day. If a tank should be completely emptied, water at 130 deg. F. will be available in half an hour with the most flexible type to 9½ hours with the least flexible. With a properly proportioned two-unit system, the booster unit is in operation for so few hours between 4 p.m. and 8 p.m. that its effect on diversified demand can be neglected.

# The Shipping, Engineering and Machinery Exhibition

## Notwithstanding trade depression the present Exhibition is one of the largest of the series

ORGANISED by F. W. Bridges & Sons, Ltd., with the patronage of several of the leading engineering associations of the country, and the support of an Honorary Committee of experts, included in which are many well-known electrical engineers, the Shipping, Engineering and Machinery Exhibition was opened at Olympia on Thursday, September 10th. The opening ceremony was performed by Sir Austen Chamberlain (First Lord of the Admiralty), who, in the course of his address, congratulated both the organisers and exhibitors, especially in view of the current industrial depression, on the noteworthy extent and character of the Exhibition, which he regarded as a striking evidence to the world of Great Britain's ability to maintain her high position in the branches of industry now represented at Olympia. The First Lord, at the luncheon following the opening ceremony, supplemented his first comments by expressing the opinion that he was convinced that British industry would be able to hold its own, despite the fierce competition to which it is now subjected.

**Echometer Sounding Device and Projector (in front)**

While all sections of the engineering industry are represented at the Exhibition, that associated with the shipbuilding industry is, perhaps, the most important, but another noteworthy feature is the remarkable progress that is being made in the design and construction of Diesel and other compression-ignition engines using heavy oils as fuel. Before commencing our review of the exhibits, particularly those of an electrical character, it may be mentioned that the Exhibition will remain open from 11 a.m. to 9 p.m. daily until Saturday, the 26th inst.

### Diesel and Other Internal-combustion Engines

In view of the important character of the section, we are commencing our review of the Exhibition with brief references to the many Diesel and other internal-combustion engines that are to be seen. The largest self-contained generating set displayed is the 320 h.p. high-speed Diesel-type engine shown by WILLIAM BEARDMORE & Co., LTD. It is a six-cylinder-in-line machine, working on the solid-injection fuel system by means of the firm's own design of variable delivery fuel pump, and designed to run at 800 r.p.m. The engine is direct coupled to an English Electric 200 kW d.c. generator, so arranged that it may be run as a motor for engine-starting purposes, the necessary current being drawn from a storage battery or other source of current. The 300 b.h.p. marine electric lighting set shown in operation by DAVEY, PAXMAN & Co., LTD., is notable for the fact that the heavy-oil engine is built up on a welded steel framing bored out to receive the separate cylinder liners and crankshaft. The fuel is supplied to the combustion chambers on the spring injection system through the medium of measuring pumps running at half the crankshaft speed. The engine is direct coupled to a Metropolitan-Vickers 200 kW d.c. generator, running at 600 r.p.m. At this stand is also to be seen a 50 b.h.p. "Avelina Invicta" high-speed (1,200 r.p.m.) Diesel engine made by the associated firm of Aveling & Porter, Ltd., the power unit being direct-coupled to a "Bull" 27 kW generator, mounted, together with fuel tank and engine cooling-water radiator, on a common bedplate.

Another large marine electric lighting set is that to be seen on the stand of CROSSLEY BROS., LTD. The engine is of the Diesel, compressorless type, comprising three vertical cylinders, and works on the four-stroke principle. Although cylinders and valve gear are totally enclosed, ready access to the latter and to the sprayers is afforded by a light sliding cover plate. The engine, which develops 195 b.h.p. at 375 r.p.m., is direct-coupled to a Sunderland Forge & Engineering Co.'s alternator developing 130 kW at 220-240 V. The fuel consumption of the engine at full, and three-quarter, load is stated to be 0.59 lb. per kWh, and the operating costs for both fuel and lubricating oil less than 0.28d. per kWh. A high-speed heavy-oil six-cylinder engine developing from 60 to 90 b.h.p. at 1,000-1,800 r.p.m. is also displayed. From an electrical point of view, interest at the stand of SIR W. G. ARMSTRONG, WHITWORTH & Co., LTD., largely centres on the 250 h.p. Armstrong-Sulzer Diesel-type engine, which is intended, among other applications, for use with an alternator for electric power production on rail cars and mobile power plants for electric traction. It is claimed that the lower initial outlay and the flexibility of the plant is such as to render it a competitor to the proposals for the change-over from steam to electric traction on railways.

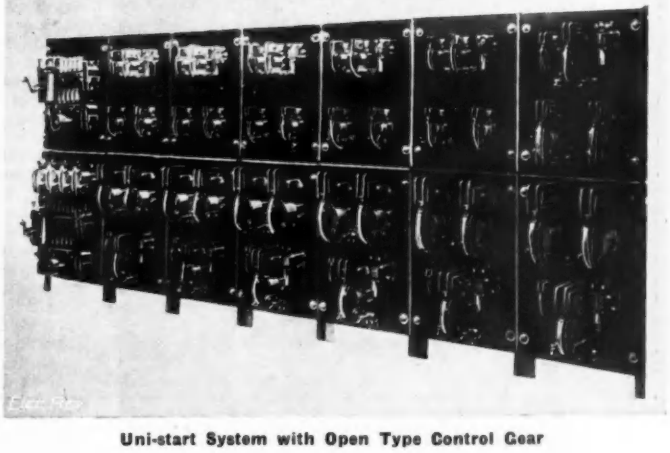
Another large marine generating set is that displayed by RUSTON & HORNSBY, LTD. The power unit consists of a five-cylinder engine, working on the Ruston airless-injection principle, and using low-grade fuel oils, starting being effected instantly from cold by compressed air. The engine is shown in operation direct coupled to a G.E.C. 150 kW 220 V generator running at 270 r.p.m. Although the engine is totally enclosed, special attention has been devoted to the accessibility of the working parts, and also to the lubrication system, which is of the forced type, with duplicated oil filters.

### Some Small Oil Engines

TANGYES, LTD., show in operation a marine set consisting of the 200 b.h.p. three-cylinder four-stroke vertical engine running on fuel oil at 500 r.p.m., and coupled direct to an E.C.C. generator. The engine is entirely enclosed, with forced lubrication to all bearings and also to the valve gear. Another interesting exhibit is a 8-9 h.p. vertical oil engine flexibly coupled to a Laurence, Scott and Electromotors dynamo, and, by a clutch, to a Reavell compressor.

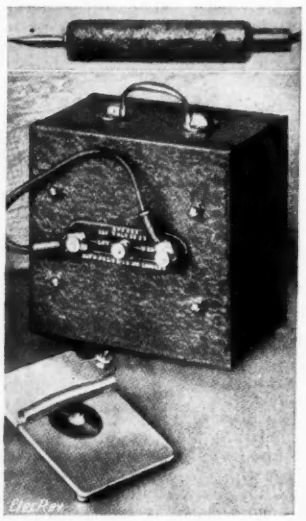
J. & H. MCLAREN, LTD., have on view McLaren-Benz Diesel oil engines, ranging in capacity from 180 b.h.p. down to 8 b.h.p. The large machines are mainly intended for marine purposes, but included in the display is a compact 5 kW lighting set. THE NATIONAL GAS ENGINE Co., LTD., is another concern exhibiting a marine auxiliary lighting set, this taking the form of a 150 b.h.p. vertical six-cylinder engine, using Diesel fuel oil, and coupled direct to a G.E.C. 100 kW 220 V generator running at 500 r.p.m. ASTER, LTD., exhibit solid-injection engines of the Diesel type, ranging in power from 9 to 40 b.h.p. at 1,000 r.p.m., and an emergency ship lighting set, comprising a 50 b.h.p. four-cylinder vertical paraffin engine—petrol being used for starting—coupled direct to a Metropolitan-Vickers 35 kW d.c. generator. Although Diesel oil engines for marine purposes form the main item of the exhibits of PETTERS, LTD., the display includes examples of their self-contained electricity-generating plants, among them being an 8 kW set for ship's use, comprising a 12 b.h.p. surface-ignition oil engine direct coupled to a G.E.C. dynamo.

Of their heavy-oil engines made in sizes up to 90 h.p., and working on the direct airless injection system, JOHN FOWLER & Co. (LEEDS), LTD., are showing a 24 h.p. two-cylinder high-speed (1,000 r.p.m.) power unit direct coupled to a Flather 12 kW generator, and a six-cylinder engine, equipped with a 12 V electric starter. A feature of the Fowler engines, to which attention is drawn, is the special cavity form of the



**Uni-start System with Open Type Control Gear**

piston heads, an arrangement which is claimed to result in improved combustion and smoother running. THE ATLANTIC ENGINE CO. (1920), LTD., who make petrol and petrol-paraffin engines of from 5 to 150 h.p., suitable for the driving of dynamos, as well as for marine propulsion purposes, display several examples of their productions, among them being a 33-42 h.p. engine, in which an impulse starter is provided in connection with the h.t. magneto. Diesel and petrol-paraffin engines are also staged by GLENIFFER ENGINES, LTD. Included in the Diesel section is a three - cylinder engine developing 45-60 h.p. at 700-900 r.p.m. While of the paraffin type, attention may be drawn to a 48 h.p. four-cylinder engine coupled to a Bruce Peebles 12 kW 110 V generator, running at 1,000 r.p.m. The engine is arranged to be started on petrol and then to be turned over to the heavy oil, which is dealt with by a vaporiser of the firm's own design.

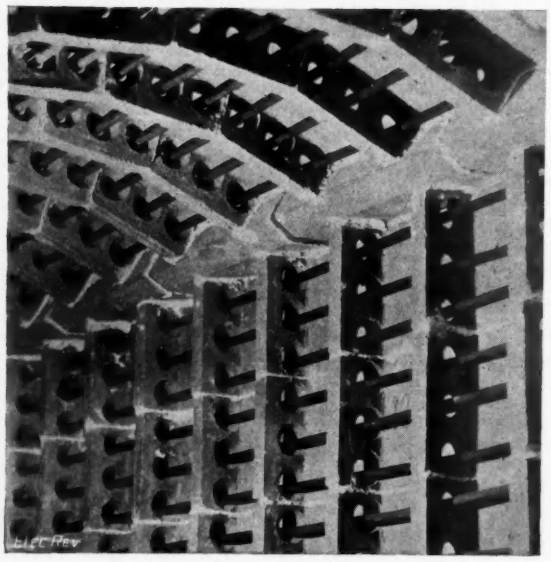


All-mains Electric Thermometer

THE RUSTON - LISTER MARINE CO., LTD., stand is devoted to a display of Diesel engine products of Ruston & Hornsby, Ltd., and R. A. Lister & Co., Ltd., power units ranging from 64 b.h.p. to 5 h.p. being on view. The smallest example is the Lister lighting plant, a compact set, comprising a single-cylinder Diesel engine, direct coupled to a dynamo generating 110 V at 600 r.p.m., together with the necessary switch-control panel. Included in the range of Deutz Diesel engines exhibited by PORN & DUNWOODY, LTD., is a compact 3 kW lighting set, comprising a horizontal single-cylinder heavy-oil engine and 115 V generator, which, together with volt and ampere meters, are all mounted on the one bedplate. Among the several Kromhout Diesel-type engines shown by PERMAN & Co., LTD., is one of 16-18 h.p., coupled to a Sunderland Forge generator. In addition to a 96 h.p. four-cylinder compression-ignition engine, designed for marine purposes, NORRIS, HENTY & GARDNERS, LTD., display three high-speed engines using light Diesel oil as fuel, one, with four cylinders, being shown in lighting set form, coupled to a 20 kW Newton 230-V, 1,000-r.p.m. dynamo.

## Spring Injection

Another concern which is devoting considerable attention to the design and construction of compression-ignition heavy-oil engines is BLACKSTONE & Co., LTD., who display power units of this type, ranging in capacity from 18-20 to 55-60 b.h.p., the largest engine having six cylinders. The machines which run at a normal speed of 1,000 r.p.m., operate on the firm's own system of spring injection, which dispenses with pumps, the fuel being fed at low pressure to the injection device by a manifold on the cylinder head. A separate injector is provided for each cylinder. The engines are started from cold on Diesel oil either by an electric starter or by a small petrol engine. Petrol-electric lighting sets are another Blackstone speciality, and are made in sizes ranging from 1 to 3½ kW, the range being represented by a 1½ kW set. Other exhibitors of compression-ignition heavy-oil engines, suitable for use with electricity generating sets, include W. H. DORMAN & Co., LTD., who also make paraffin and petrol engines for the same purpose. MORRIS MOTORS, LTD., also show for the first time 10-20 and 12-24 h.p. four-cylinder petrol engines suitable for the driving of small dynamos and welding plants. BOSCH, LTD., in addition to magnetos for ignition purposes, and electric horns for rail cars, and for marine and factory use, working at voltages between 24 and 110, are now devoting a good deal of attention to equipment for Diesel and other compression-ignition oil engines, for the starting of which a 6 h.p. 24 V motor is displayed.

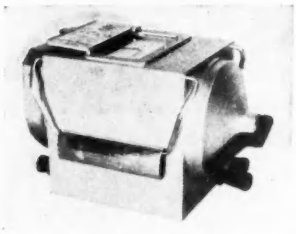


Interior View of Hair-pin Electric Furnace

## Plant for Steam-operated Power Stations

Pride of place at the stand of C. A. PARSONS, LTD., is given to a complete installation of one of the firm's Uniplane turbo-geared alternator sets of 250 kW capacity, in which the condenser, instead of being located under the turbine, is in this case mounted alongside and parallel with it, an arrangement which reduces the cubical or superficial area occupied. The turbine blading is of the impulse-reaction type, and made from stainless iron. The turbine is designed to run at 9,000 r.p.m., and drives the generator through silent gearing at 3,000 r.p.m. The transformer section of Parsons's activities is exemplified by an 800 kVA 8,000/440 V set, fitted with off-load tap changing switch, and an 800 kVA 3,000-2,750/440 V transformer.

BABCOCK & WILCOX, LTD., in addition to a large marine boiler and a number of models of boilers for central station and general industrial use, are displaying "calorized" solid-drawn pyrometer sheaths, and samples of similar work made of "calmet," a high-temperature and corrosion-resisting alloy of the chromium-nickel-aluminium class. A working display of their forced-draught chain grates for boilers, and of the Bennis air-draught stoker, with self-cleaning furnace, is made by EDWARD BENNIS & Co., LTD., for both of which numerous advantages are claimed. It is not generally known that Messrs. Bennis are also large makers of public wash-house plant, several examples of which are on view, including an under-type electrically driven hydro extractor.



The "Meg" Earth Tester

At the stand of ALFRED HERBERT, LTD., is to be seen an example of the Modave dust arrester, which is in use at a large number of power stations in France, and which has been adopted in this country at the municipal generating station at Wallasey. The purpose of the apparatus is to remove the dust from the gases from pulverised coal-fired boilers, an efficiency of over 90 per cent. being claimed. The apparatus is entirely static, only water being used to arrest the dust, which is carried along to settling tanks. The arrester which can be fitted to existing boiler plants, also absorbs a large proportion of the sulphur oxides contained in flue gases. A new electrically operated scaling hammer is shown by the ALPHAG UNIVERSAL SCALING MACHINE CO., LTD., one of the features being the method of securing the hammers in such a way that should any single hammer break it can be removed and replaced in a few seconds.

## Heat Recording and Regulating Instruments

An interesting section of the Exhibition is that of the displays of instruments and apparatus for indicating, recording and automatically regulating temperatures and pressures. In this category the first exhibit to be seen is that of the DRAYTON REGULATOR & INSTRUMENT CO., LTD., which includes some ingenious devices for controlling temperatures from that necessary for refrigeration up to 1,000 deg. F. In some of the instruments magnetic make-and-breaks are used and in others the mercury-tube pattern. NEGRETTI & ZAMBRA, in addition to examples of precision instruments which have been on the market for some years, introduce several new appliances, and to attract attention to them have adopted the useful plan of marking them with a red star. Prominent among the newcomers is the "all-mains" electrical thermometer for cold storage shown above for operation directly from electricity supply circuits instead of by dry batteries or accumulators. The instrument is constructed on the Wheatstone Bridge principle, with the fourth arm of the bridge arranged in the form of a thermometer bulb, wound with nickel or platinum wire. The latter changes its electrical resistance with variations in temperature, so altering the balance of the electrical circuit and deflecting the galvanometer from the zero position. Another novel instrument, designed for use in the refrigerators and holds of ships, is a photographic temperature recorder, which, at stated intervals, takes a photograph of a standard mercury thermometer on a sensitised chart, the mechanism being actuated by a combination of clockwork and a small electric motor.

Another large display of heat controlling and other instruments is that of ELLIOTT BROS. (LONDON), LTD. Of special interest are the Shotter current transformers for testing the

current passing through links and fuses in feeder and distribution boxes and a portable clamp-type tester comprising Shotter split-core transformers for measuring the current passing in an a.c. cable without interrupting the supply and without interfering with the insulation in any way. Electrical pyrometers and thermometers are among the specialities of the FOSTER INSTRUMENT CO., a noteworthy feature of which is the "Resilia" spring mounting of the moving parts to protect them against damage by vibration or shocks in all directions. Also shown are dead-beat ammeters, voltmeters and millivoltmeters, all embodying the "Resilia" method of mounting. Among the numerous instruments to be seen at the stand of the SARCO CO., LTD., is an electrical pyrometer for controlling temperatures up to 2,500 deg. F. MAURICE WARLOW & CO. show an ingenious device for recording water levels and mechanical movements at a distance. Known as the "C. & S.," the apparatus comprises a float working in conjunction with a choking coil, so arranged that the variation in the e.m.f. is in direct proportion to the change in water level, the variations being conveyed from the choking coil terminals to the remote indicator by an ordinary two-wire cable.

## Electrical Testing Apparatus

EVERSHED & VIGNOLES, LTD., is another concern making a big display of electrical instruments, including marine signalling apparatus and Megger and Bridge-Megger testing sets, a new device being seen in the "Meg" earth tester, which gives a direct reading and is small and compact; this instrument is illustrated on the previous page. Special attention may also be drawn to the Evershed-Midworth distant repeater equipment for the remote control of unattended sub-stations. The apparatus is so designed and constructed as to permit the remote starting and stopping of machines, to raise or lower the voltage, open or close circuit breakers, and to give a return indication of the values of various current and voltage quantity measurements. Among the many interesting instruments to be seen at the stand of the RECORD ELECTRICAL CO., LTD., is an electrical tachometer with a 300 deg. indicator of the "Cirscale" pattern, two new types of which, specially designed for continuous running over long periods without attention, have lately been introduced. Attention may also be drawn to the Record moving-iron voltmeters for a.c. testing, combined 1-750 voltmeters and 1-600 amperemeters, and the range of d.c. and a.c. circuit breakers in single, double and triple pole forms, with toggle-action mechanism and self-aligning brushes.

At the stand of the EQUIPMENT & ENGINEERING CO., LTD., is shown an ingenious instrument for the magnetic analysis of the internal structure of iron and steel and the detection of surface cracks. It is designed to deal with bars up to a diameter of 4 in. By means of magnetising solenoids influenced by a.c. and secondary exploring coils, the difference between the induced currents of a standard piece of metal and the bar under test is indicated by a visible oscillograph, the wave form showing any distortions due to internal flaws or variations in the molecular composition. Another exhibit is that of a magnetically acting instrument for detecting cracks in axles, connecting rods, crankshafts, and other iron and steel parts subject to stress. KELVIN, BOTTOMLEY & BAIRD, LTD., in addition to a number of special instruments for use on ships, devote part of their stand to a display of apparatus for ships' hospitals and surgeries, including shadowless operating theatre lamps, portable X-ray outfits, and also sunshine lamps for ultra-violet ray illumination in swimming pools, sun parlours and lounges.

## Switch and Control Gear

Several interesting examples of their productions in the way of switchgear are to be seen at the stand of BROOKHIRST SWITCHGEAR, LTD., prominent among which is the patent Uni-Start type switchboard. As will be seen from the illustration on page 429, open-type control gear for a number of motors is mounted on a main switchboard, each motor in addition having its own electrically operated contactor; the actual functioning of the starter and contactors being, in turn, controlled by push-buttons adjacent to each motor. Other Brookhirst exhibits comprise a combined fan motor starter and speed regulator, complete with all resistances, inter-connections and terminals; a drum-type control panel for motors up to 100 h.p.; the "Pneutral" control gear for the starting and stopping of electrically driven pumps; and an automatic solenoid-type control panel, arranged for operation either by the "Pneutral" device or by a float-switch.

The IGRANIC ELECTRIC CO., LTD., has a varied and interesting display of a variety of electrical apparatus, prominent among which are improved forms of magnetically and motor-operated brakes for, among other applications, quickly bringing electric motors such as are used on lifts to a standstill. The Igranic magnetically operated clutches, made in transmission capacities up to 2,000 h.p., are represented by three of the smaller sizes. Attention may also be drawn to a new type of triple-pole overload relay which, in addition to affording protection against overload, also incorporates an instantaneous phase-failure release for the prevention of "burn-outs" in polyphase motors, due to interruption of one phase of the supply, to a new double-pole pressure-operated switch for the automatic starting and stopping of electrically operated compressed-air plant largely used in garages, and to a self-acting control panel for a 75 h.p. slip-ring motor.

## Radio Equipment for Ships

One of the largest stands in the instrument section of the Exhibition is that of the MARCONI INTERNATIONAL MARINE COMMUNICATION CO., LTD., which is devoted to a comprehensive display of the latest apparatus for wireless telephony and telegraphy transmission and reception, band repeaters and music-playing equipment. It would take up too much space to deal at length with the various equipment on view, but special attention may be drawn to the Echometer Marconi sounding device for ascertaining the depth of water under a ship. The instrument (page 429), which is made on the Langevin-Chilowsky system, uses the equivalent of a very low power wireless transmitter to send a signal from the ship to the sea bed from which it is reflected back to the point of origin at a known speed. By measuring the time lapse between transmission and reception of the signal, the depth of water below the ship is visibly indicated on a scale calibrated in fathoms and metres, the depth being repeated over fifty times per minute. The signal projector consists of a mosaic of crystals compressed between two thick steel plates, the outer one of which is made to vibrate at high frequency, thus imparting a wave motion to the water. The equipment is extremely compact and is operated from an ordinary four-volt accumulator.

Examples of the latest practice in wireless equipment for ships is also displayed at the stand of the RADIO COMMUNICATION CO., LTD., 1½ and ½ kW installations being shown in two representative ship's cabins in order to give a visible demonstration of the size and the space they occupy. Chief among the instruments shown are a radio direction finder, made to comply with the requirements of the Safety of Life at Sea Convention, an auto alarm apparatus for the reception of distress calls at sea and a compactly arranged combined radio transmitter and receiver for use on ships' lifeboats, specially designed for establishing communication with any rescuing ships in the vicinity. A model is also displayed of the lattice steel masts supplied by the company to various broadcasting stations.

## Ship and Other Communication Instruments

Still another interesting section of the Exhibition is that devoted to loud-speaking telephones for marine and factory use. Among the exhibitors in this division are CLIFFORD & SNELL, LTD., who are showing an instrument with a special transmitter which, without reducing the volume of speech, eliminates any extraneous noise; another point of interest is the use of a high-frequency call-up note instead of bells. On the stand are also to be seen a "Loudaphone" which, as the name implies, enables messages to be transmitted and received in noisy places, and an ingeniously arranged telephone system switchboard with visible indicators. Some interesting examples of telephonic and speech-amplifying instruments are to be seen at the stand of ALFRED GRAHAM & CO., LTD., including a navy 'phone with a new unit, which is claimed to give increased efficiency as regards both volume and articulation. Another exhibit of interest is a din-proof 'phone, especially designed for use in noisy places, large numbers of which have been supplied to the Japanese Navy. Other Graham exhibits comprise loud-speaking multiphones, band repeater sets, helm and engine indicators, and a compactly arranged navigation light indicator.

Gyro compasses and other marine instruments form the main display of S. G. BROWN, LTD. Among those worthy of inspection being the North Steaming Error Corrector and the Automatic Damping Cut-Out, the latter being a magnetically operated device, arranged to come into action automatically to correct the inherent residual error in gyro compasses after turning ship. Examples of the well-known Brown loud-speaking telephones and electro-megaphones are also displayed. Loud-speaking telephones for ships' use form the main exhibit of the TELEPHONE MANUFACTURING CO., LTD., which, however, is also showing examples of its private automatic telephone exchanges and intercommunicating telephones for works and office use, and also battery and mains-operated electric clocks.

## Electric Furnaces

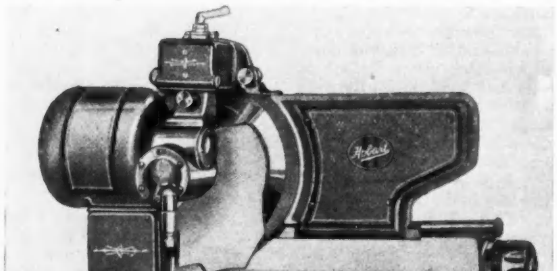
Occupying the first place in the catalogue, WILD-BARFIELD ELECTRIC FURNACES, LTD., have a large stand, on which is displayed a full range of automatic hardening and tempering furnaces, some of them being shown in operation. A new departure in carburising and general heat treatment furnaces has been made, as in addition to those in which the elements consist of large-section wire helices, a type is now being introduced in which the elements consist of heavy nickel-chrome hairpin rods extending the full length of the furnace both in the roof walls and floor, as shown in the illustration on the foregoing page and, when necessary, in the door and back. Among the technical advantages of the new design, in the case of furnaces up to 8 or 9 ft. in length, are the ease and simplicity with which any of the elements can be removed, a task which can even be performed when the furnace is at working temperature. Other exhibits of interest at this stand include a forced-draught air tempering furnace with automatic temperature control, and a pusher-type furnace designed for dealing with small quantity-production cylindrical parts, a double row of which pass along two V-shaped channels through the furnace. The pusher mechanism, which is operated by a small motor with reduction gearing, is so set as to give one push per minute when the furnace is dealing with parts measuring ½ in. by 4 in.

# The Confectioners' and Bakers' Exhibition. By Viola Ripley, B.Sc.

## Items of Electrical Interest

FROM the electrical point of view there was much of interest at the Confectioners' and Bakers' Exhibition, held at the Agricultural Hall, London, from September 5th to 11th, but there was nothing really novel.

The most prominent exhibits were those concerned with bread-making. There is no part of the process which cannot be done electrically, from conveying the flour to the sifter to the final wrapping of the loaves. Baker Perkins, Ltd.,



**Hobart Meat Slicing Machine**

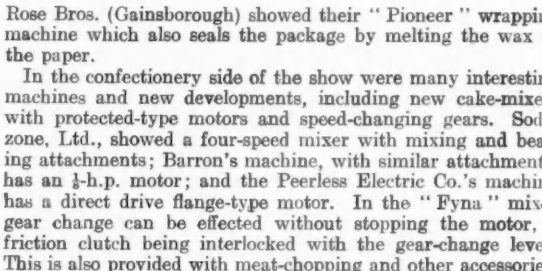
showed a new portable fixed-pan kneader with direct electric drive from a totally enclosed motor, and capable of dealing with half a sack of flour. The Vioroid process of irradiating dough with ultra-violet rays was shown by the Artofex Engineering Works, Ltd. The Kneeda Manufacturing Co. displayed a new "Lidon" bowl-tilting apparatus for use with kneaders with detachable bowls. The bowl, containing a large quantity of dough, is inverted and the dough emptied into a hopper. Push-button control with automatic trips is provided at each of the extreme positions. From the kneading machine the dough passes into a weigher and divider which separates the dough into pieces of the required weight. Herbst introduced a combined dividing and moulding machine for rolls, driven by a 1-h.p. motor and providing up to 12,000 rolls per hour.

Electric ovens were exhibited by the General Electric Co., Ltd., Baker Perkins, Ltd., and the United Yeast Co., Ltd., and the British Steam Oven Co. showed an interesting oven light which is automatically switched on when it is turned to project light into the interior of the oven.

An interesting electric bread-wrapping machine was seen on the stand of C. S. du Mont; the package is sealed electrically. Rose Bros. (Gainsborough) showed their "Pioneer" wrapping machine which also seals the package by melting the wax of the paper.

In the confectionery side of the show were many interesting machines and new developments, including new cake-mixers with protected-type motors and speed-changing gears. Sodazone, Ltd., showed a four-speed mixer with mixing and beating attachments; Barron's machine, with similar attachments, has an ½-h.p. motor; and the Peerless Electric Co.'s machine has a direct drive flange-type motor. In the "Fyna" mixer gear change can be effected without stopping the motor, a friction clutch being interlocked with the gear-change lever. This is also provided with meat-chopping and other accessories, making it a universal kitchen machine.

A new pie-moulding machine with electrically heated dies was shown by J. P. Jackson, while Melvin & Gillespie showed a new "Gillespie Viscut" biscuit-cutting machine with a special scrap-removing device. For restaurant work, Milkanic introduced a new small emulsor which works on the same principle as their larger models. Frigidaire, Ltd., exhibited a



**"Viscut" Biscuit-cutting Machine**

new freezing table for ice cream and new rubber freezing trays for preparing small blocks of ice.

J. & E. Halls displayed a new freezing table with chambers at three different temperatures, freezing for making ices, cold for storing ices, and cool for storing butter and milk. A compact meat-slicing machine was shown by Hobarts. A dish washer on Read's stand has revolving, fan-shaped sprays and a rinsing device, and it was observed that Hobart's new dish washer has revolving fan-shaped sprays and a rinsing device, the water for which is electrically heated.

# Tungsten Plating

## New Alkaline Method

ALTHOUGH considerable improvements have recently been made in chromium plating, especially in the direction of obtaining thicker layers (up to 0.007 in. thick), with corresponding increased resistance to corrosion, it yet remains true that tungsten plating is in many ways superior and more resistant. For example, a metal electro-plated with tungsten is not affected by any mineral acids, and, although it is attacked by a mixture of nitric and hydrofluoric acid, it is resistant to either separately. It is thus very valuable in chemical plant; also its silvery white colour and the facts that it does not tarnish in dry air, is unaffected by sulphur and phosphorus, and is exceedingly hard, make it very attractive for many uses in the electrical and allied trades. Its high thermal conductivity and melting point make it particularly suitable for electrical contacts and arcing points exposed to great temperature changes.

Considerable advance in the technique of tungsten plating was made by van Liempt (*Zt. f. Elektrochem.*, 1925, *31*, 249). If a sufficiently high temperature is used, a pure adhesive deposit of tungsten is obtained. Lithium tungstate is a suitable material for the purpose, together with sodium tungstate and tungstic oxide. In the process covered by patents Nos. 236,152 and 236,153 a current density of from 0.2 to 0.8 ampere per sq. cm. at 0.08 volt is required to get an adherent deposit. At the high temperatures required, the most suitable metals for coating are those which have a high melting point, such as nickel, cobalt, and alloys. Such coatings will take a high polish and may be acutely bent without cracking (see also C. J. Smithells, on "Tungsten," Chapman & Hall).

In a recent paper read before the American Electrochemical Society at Birmingham, Ala., U.S.A., Messrs. C. G. Fink and Frank L. Jones describe methods of tungsten plating with an alkaline solution. Working at ordinary room temperature, the deposit consisted of tungstic oxides and some pure metal finely divided, but at a temperature of about 80 degrees C. the cathode was covered with a thin layer of silver-white metal. The optimum current density was from 75 to 100 amperes per sq. ft., though good deposits were obtained with current as high as 400 amperes per sq. ft. A very satisfactory plating bath was made up of sodium carbonate solution with tungstic acid added. It is neither poisonous nor corrosive, the necessary tungstic compounds are readily obtainable in a pure state, and the tungsten deposit is clean and bright. The only objection is that the bath is not completely stable, and deteriorates with continual use. Voltage-temperature relations were thoroughly studied, the voltage measurements being made from anode to cathode, and from a point 0.8 mm. from the cathode at various temperatures ranging from 20 to 95 degrees C., to determine whether a rise in temperature caused any increase of the hydrogen over voltage. With a solution of sodium hydroxide, dextrose, and sodium tungstate it was found that the deposit on a nickel anode thickened more quickly than that on a platinum anode, an alloy of nickel and tungsten probably being formed. Iron gave results similar to nickel, also by the addition to the bath of small amounts of iron oxalate, or by the use of ferro-tungsten as the anode material; but these iron alloys thus formed with the tungsten were not as chemically resistant as the nickel alloys.

So far as spark-gap electrodes, high-frequency breaker points, etc., are concerned it would seem that the fusion methods used by the Tungsten Manufacturing Co., Ltd., for example, are the most effective at present in use.

# New Apparatus and Devices

## for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

### Improved Switches

We have received from the Wandsworth Electrical Manufacturing Co., Ltd., Kenyon Street, Birmingham, samples of its new-pattern 5-A.q.m. and b. underslung switches, which are supplied in various surface and flush patterns. No. 800 S is of the all-insulated type in brown, the "Bakelite" cover being provided with a metal insert carrying the securing thread. The following are the notable features of these switches: full positive action, very long break, pear-shaped and specially reinforced dolly, phosphor-bronze flexible contacts, copper-plated spring. A sample from which the spring has been omitted demonstrates clearly the full positive action of the switch; the make and break are good. Two all-insulated surface switches and two switches of the earthed flush pattern were subjected to current-breaking tests on a 275-V d.c. circuit, controlling a non-inductive load, at the Faraday House Testing Laboratories. The two surface switches failed to break the circuit at loadings of 19 and 18 A, respectively, and the flush switches each failed at 15 A.

### A New "Quakerlite" Fitting

An addition has just been made to the range of lighting fittings manufactured by SILAS QUAKER, LTD., of 110, Park Street, Camden Town, London, N.W.1. The new "Quakerlite" fitting has the same attractive features as the models described in our issue of June 5th, 1931 (p. 955), and should appeal particularly to the electrical contractor who does not care to carry a large stock. The "Sunray" pendant, as it is called, provides no fewer than eight different types of fitting, and can be utilised both for upward and downward lighting. A "Sunray" arm is also supplied mounted on a wooden backplate for use as a wall-bracket. Made of "Bakelite" throughout, the new fitting is excellently constructed, and is supplied in oak, mahogany and walnut finishes.

### For Measuring Distributor Loads

It is important for the mains engineer to be able to ascertain the load on any distributor at any time. While in larger sub-stations suitable meters may be installed and plugged in as required, in the smaller kiosks or pillars there is generally little room to accommodate the necessary meters. An engineer with about fifty kiosks fitted with "CSW" fuse and link gear approached for assistance PRICE & BELSHAM, LTD., 52, Queen Victoria Street, E.C.4, who have adapted the "Ampertongs" current measurer to this new use. The "CSW" fuse (or link) has two little lugs, one on the top and one on the bottom

P. & B. "Amperclamp" in use with "CSW" Fuse

contacts, for clipping the loose insulating handle on when the fuse (or link) is inserted or withdrawn. The P. & B. "Amperclamp" consists of a base made of two pieces of insulating material hinged together and provided with a clip at the top and bottom to hook on to the lugs on the fuse. The jaws of the "Ampertongs" are mounted one on each half of the hinge, whilst a handle is fitted to facilitate opening the tongs and placing the apparatus in position. A strong spring closes the hinge and ensures that the jaws butt together tightly and make a good magnetic circuit. A flexible lead about 3 ft. long carries the induced current to a small maximum demand meter fitted with feet like an alarm clock, so that it will stand conveniently on the fireproof shield between phases. Up to the present the meters are of hot-wire type and have a 4-in. scale.

### Armature-winding Machine

A new and improved type of armature-winding machine for which a number of special features are claimed has been placed on the market recently by FROITZHEIM & RUDERT, Berlin. It is marketed in this country by Mr. Frank Whitelegg, 35, Union Road, S.E.16. One of the main advantages is that the armature remains stationary during the winding operation, and the wire is wound carefully and accurately in the grooves by means of a rotating arm. As the armature does not revolve, one-sided armatures do not need to be balanced, but can be wound at high speed. The wire is handled very carefully by the machine, so that the finest wires can be used without any danger of breakage. A further advantage claimed is that the hand work can be carried out easily on the stationary armature, and the wires can be connected up in the most rapid and satisfactory manner. Spindle lengths up to about 10 in. can be accommodated, and diameters up to about 3½ in. The gripping device for the armature is adjustable in length very easily, and a counter with moving figures and zero adjustment is provided. The speed of the winding arm is up to 800 r.p.m., and the sizes of wire which can be accommodated are from 45 to 25 S.W.G.

### Ironclad Switch-fuse and Fuse Unit

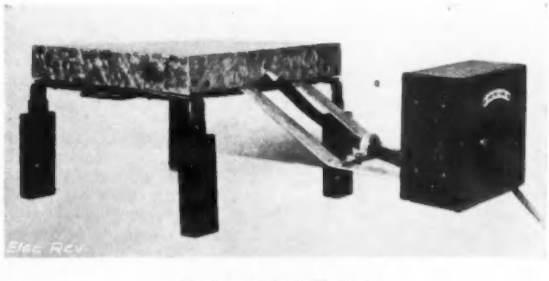
The "Junior" 15-A d.p. ironclad switch and switch-fuse recently introduced by the EDISON SWAN ELECTRIC CO., LTD., 123-5, Queen Victoria Street, E.C.4, present some interesting departures from normal practice. A very light case, practically unbreakable, results from the use of pressed metal. The switch has a rapid, smooth and positive make and break action. It is constructed with a minimum number of working parts, and the blades cannot remain in any intermediate position between "on" and "off." The cover is interlocked with the switch, so that it cannot be opened unless the switch is in the "off" position. The switch contacts are shrouded so as to give adequate protection from arcing to the case. Bushed holes are provided in the top and bottom of the case to allow for simple straight-through wiring.

Ediswan "Junior" Switch-fuse

An important feature of the switch-fuse is the new fuse unit employed. Terminals and screws are eliminated by the use of special formed members on the phosphor-bronze contact clips, which firmly secure the fuse wire when inserted, the wire being held in a fold of each contact. The construction affords a fusible break of about 2½ in. Projections and recesses in the base and bridge, respectively, when in position, afford locking protection against vibration. The cables are led directly into the contact blocks from the top and bottom, and are secured by screws accessible from the front. The fuse unit is also incorporated in a new line of distribution boards introduced by the company.

### A Heater for the Poultry Farm

The trivet heater made by CURFEW ELECTRIC HEATERS, Curfew Poultry Farm, Gogmore, Chertsey, Surrey, has been designed for converting existing brooders and hovers to electric heating. The heater elements are clamped to the upper side of an aluminium plate, the whole being suitably lagged to project the heat downwards. The aluminium plate has a wire guard under it to prevent the chicks touching it. The heater is fitted with four adjustable legs, these legs being covered with wood to prevent any heat travelling down the metal part of the legs getting to the chicks. The heat control switch is extended so as to come through the brooder curtains. Heat control is effected by tappings on the elements, and provision is made to keep in circuit one set of tapped elements after it has been switched full in, while other sets are switched in, this being done by the turn of one knob. Practically any number of heat selections can be arranged for, usually from 1 A in about 0.1-A stages. The heaters are made in the following sides and loadings: 1 A loading for 50-100 chicks; 1.5 A, 150 chicks; 2 A, 250 chicks; 3 A, 300 chicks; and 5 A, 500 chicks. These heaters are also made with chains for hanging under the canopy hover instead of standing on legs. A three-core rubber-sheathed flexible lead is used for conveying the current to the heater, one core being used for earthing the heater.

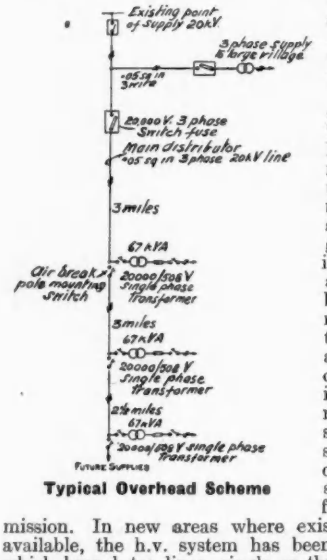


Curfew Trivet Heater

# North-east Coast Rural Development

## To the network of the Newcastle-upon-Tyne Electric Supply Co., Ltd., and its subsidiary companies is connected the largest industrial, domestic, and rural loads of any European supply undertaking

THE making available of electricity in rural areas usually precedes the demand, and in the earlier stages of development the revenue is relatively small. The high-voltage distribution system must, therefore, be designed for the minimum of cost consistent with a reasonable standard of service. About 50 per cent. of the total cost of giving rural supplies is represented by high-voltage overhead lines. It is not economically possible always to afford duplicate supplies, such as are usual in cases of larger towns or collieries; single tappings on an overhead system enable satisfactory supplies to be given to consumers who would otherwise have to do without.




**Typical Overhead Scheme**

The fundamental policy of the Newcastle-upon-Tyne Electric Supply Co., Ltd., throughout the 4,700 miles of its supply area is that the reliability of the more important supplies shall not suffer from the giving of other supplies. It is, therefore, necessary that a fault on the secondary high-voltage system shall not cause a disturbance on the main system. In some areas where it has not been considered sound engineering practice to tap for a number of small individual supplies, a main point of supply has been provided on the trunk main for stepping down to 5.5 kV for secondary transmission. In new areas where existing h.v. mains are not available, the h.v. system has been made three-phase, from which branch-tee lines, single or three-phase depending upon local requirements, have been tapped.

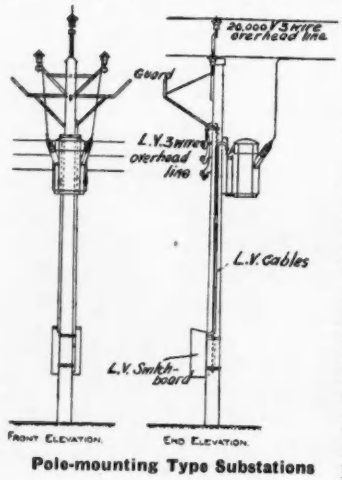
### Constructional Features

Constructions are usually of 0.05 sq. in. copper, but sections of 0.025 and 0.1 sq. in. have been used.

Air-break switches have been used to sectionalise long main high-voltage distributors fed from either end in order to facilitate fault location and maintenance and to ensure that any failures of supply may be of as short a duration as possible.

The cost of tapping points, within limits, does not seriously affect the total capital cost of a complete scheme, but it is sound practice to minimise the amount of plant requiring maintenance.

Substations for supplies to villages, farms, and country houses are usually of the pole-mounted or kiosk types. In the former case pole-mounted transformers are suitable for loads not exceeding 50 kVA, where the power is obtained from an overhead line. The transformer is mounted near the top of the pole and is often directly connected to the high-voltage line; as the reliability of the modern transformer is such that the installation of a h.v. switch and fuse is not justified in every case, a low-voltage disconnecting switch and fuses, and sometimes meters, are housed in a metal service box near the foot of the pole to which the l.v. cables are run in conduit. The kiosk type of substation can accommodate very much larger transformers and may be used on either overhead or underground systems.



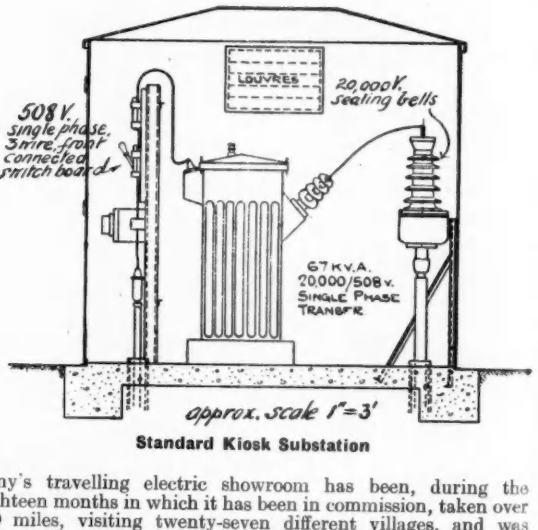

**Pole-mounting Type Substations**

Where farms are situated close to existing l.v. networks, services are generally provided by the companies and terminate at the most suitable point on the farm for distribution to the various buildings; the development of the domestic load at the farm itself is always borne in mind. Where a farm is not adjacent to a low-voltage network, supply is made available from an overhead high-voltage line by means of a pole-mounted transformer. From this point the farmer generally provides his own low-voltage overhead line to a distribution point on his farm.

### Present and Projected Developments

The technical particulars given above have been evolved by the Newcastle-upon-Tyne Electric Supply Co., Ltd., from experience gained since, in 1906, it first planned the beginnings of its present transmission system.

The public has (unfortunately, we think) heard very little of this work, which has been valuable not only to the consumer, but to the electrical world as a whole, as the company has provided a good training ground for engineers in many parts of the country. We therefore welcome the issue of an attractively produced and well-illustrated brochure entitled "North-East Coast Countryside Electrical Development," which contains particulars of the company's present and projected developments in its more sparsely populated areas. The data presented should be useful to all engineers interested in rural electrification. Work in hand includes the giving of supplies in the Pickering Vale district, an area of about 150 square miles containing 26 townships and villages and a population of 17,000 and 3,500 premises which may be regarded as potential consumers. The whole of the area is almost entirely dependent upon agriculture; it will be fed by means of 60 miles of transmission line from Malton. Other extensions will add a further 155 sq. miles to the company's countryside districts. The company is preparing to add to its system nearly 170 miles of transmission lines, as well as distribution and service mains, for supplying electricity in rural districts with a population of some 60,000. The company's travelling electric showroom has been, during the eighteen months in which it has been in commission, taken over 350 miles, visiting twenty-seven different villages, and was attended by 7,000 people. It was responsible for adding 650 h.p. during that period, with considerable other consequential connections. The company is prepared to supply all approved electrical appliances on the easy-payment system in any of its areas.


LOUVRES
20,000 V. sealing bells
508 V. single phase, 3 wire, from connected switchboard
67 KV.A. 20000/508 V. SINGLE PHASE TRANSFR.
approx. scale 1"=3'

**Standard Kiosk Substation**

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### The Need for Confidence

At a luncheon arranged by the British Works Management Association recently an address was delivered by Mr. G. Hurford (Standard Telephones and Cables, Ltd.), the chairman of the Association. Mr. Hurford said that confidence abroad was of little use unless it was supported by confidence at home. Unless the country generally had a reasoned faith in the future of our industries, and in the capacity of those engaged in managing and directing them, the prospects of an early revival of trade would be extremely remote. Most of the criticisms of our industrial ability were made by people who did not appreciate the enormous strides which had been made in recent years in raising the standard of productive efficiency. It should be remembered, however, that the British manufacturer was labouring under more handicaps than his foreign competitors in the way of taxes and other non-controllable costs. One of the most important figures in industry in the future would be the works manager; in a sense, he would be primarily responsible for Britain's industrial future. His task, however, was full of difficulties, and the community would be well advised to give him every encouragement, and to refrain from making unwarrantable reflections on his ability and vision.

# Business and Industrial Notes

**The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures**

## The Bucks County Show

A feature of the Bucks County Show, held at Waddesdon last week, was the extensive display of electro-agricultural machinery, several well-known electrical companies being represented. On the stand of the English Electric Co., Ltd., was exhibited a 7 h.p. portable agricultural motor, suitably mounted on a well-designed truck with telescopic belt adjusting device, while the General Electric Co., Ltd., was showing a portable farm "Drummotor," designed in the form of a drum, thus permitting great flexibility of movement. "Blue Ribbon" electric milkers comprised the exhibit of Messrs. J. Harrison & Co. (Liverpool), Ltd. Milk separators and butter-making plant were displayed by Messrs. R. A. Lister and Co. The Hotpoint Electric Appliance Co., Ltd., had on view a number of electric washers and ironing machines. The Aylesbury Electricity Department added considerably to the display with domestic apparatus, electric water pumps, and sheep-shearing and horse-clipping apparatus, together with a chicken-run and chickens reared by the Department with an electric brooder and incubator, which was also on show. The Electricity Department was also represented in the Horticultural Section of the Show, where an illuminated waterfall designed and executed by the Department was in operation. Thirty special G.E.C. multi-coloured fittings were employed, and the colours operating on the waterfalls, together with the beautiful fern and flower display embodied in the design of the fountain, produced a most spectacular effect.

## Registered Electrical Contractors

Applications for registration from the following were accepted by the Executive Committee of the National Register of Electrical Installation Contractors at its last meeting:—

Clarke, G., Alnwick, Northumberland.
Hammond, R., Thornton Heath.
Piggott Bros., & Co., Ltd., London, E.C.2.
Reynolds, H., Southsea.
Davis, G. J., & Sons, Southsea.
See & Burgess, Fareham.
Hodgson, H., Chorlton-cum-Hardy.
Lawton Bros., Uppermill, near Oldham.
Horrobin, W. L., Birmingham.
Lambert, L. Wm. J., Great Crosby, Liverpool.
Central Electrical Co., Moss Side, Manchester.
Neale, J., Southborough, Tunbridge Wells.
Oldham, R., Middleton.
Dalton, A. J., Electrical Services, Dorchester.
Whitter, C. L., Congleton.
Lockett, Lloyd & Statham, Ltd., Wilmslow.
Wood, Fred, & Son, King's Heath, Birmingham.
Furneaux, Riddall & Co., Southsea.
Lane & Ryder, Ltd., Liverpool.
Parfitt, G., & Co., Farnham, Surrey.
Thursfield, H., & Co., Congleton.

At the same meeting one application was withdrawn, and twenty-three were declined.

## Italian Electrical Imports and Exports

A return just to hand shows that the imports of electrical machinery, supplies and apparatus into Italy during the five months ended with May last attained a value of £1,155,620, as compared with £1,594,120 in the corresponding period of 1930. The exports of similar material from Italy during the same period also declined, from £386,980 to £369,725.

## Floodlighting at Bradford

Some very effective floodlighting was carried out at Bradford during Pageant Week by the Wardle Engineering Co., Ltd. The Cathedral tower at night made a very impressive picture, while an excellent effect was made with the installation at the Victoria Memorial. We show here a view of the pageant ground in Peel Park, where seventeen "Wardle Senior" floodlights with 500-watt projector lamps were installed for the illumination on the ground, and the replicas of the old buildings and the Cathedral.

## Belgian Foreign Electrical Trade

The following table shows the Belgian imports and exports of electrical machinery, apparatus, and cognate goods during the first half of the current year as compared with the corresponding six months of 1930, the values have been converted at an exchange rate of 175 fr. to the £.

| | Imports. January-June. | | Exports. January-June. | |
|---|---|---|---|---|
| | 1930. | 1931. | 1930. | 1931. |
| | £ | £ | £ | £ |
| Dynamo electric machinery .. | 573,215 | 303,045 | 150,105 | 138,975 |
| Dry batteries .. .. .. | 11,500 | 13,360 | 14,085 | 9,595 |
| Accumulators and parts .. .. | 19,900 | 23,310 | 29,120 | 26,565 |
| Magnets (other than electro-magnets) .. .. .. | 2,075 | 3,765 | 105 | 17 |
| Land and submarine cables .. | 90,935 | 30,700 | 139,845 | 93,845 |
| Insulated wire .. .. .. | 80,220 | 39,845 | 146,750 | 118,780 |
| Copper wire (not insulated) .. | 39,765 | 4,480 | 2,055 | 265 |
| Carbons and electrodes .. .. | 20,175 | 20,555 | 470 | 235 |
| Porcelain insulators .. .. | 27,015 | 17,200 | 2,700 | 1,730 |
| Electric globes and glassware .. | 36,400 | 27,790 | 31,905 | 21,000 |
| Insulating tubes, junction boxes, &c. .. .. .. .. | 20,925 | 17,475 | 7,825 | 3,300 |
| Other insulating material .. | 20,325 | 18,115 | 1,515 | 345 |
| Arc lamps .. .. .. .. | 710 | 235 | 860 | 11 |
| Incandescent lamps .. .. | 130,435 | 104,565 | 48,630 | 41,620 |
| Radio valves .. .. .. | 14,985 | 55,055 | — | — |
| Electric measuring instruments | 99,915 | 74,465 | 3,815 | 3,155 |
| Telegraph and telephone apparatus .. .. .. .. | 206,460 | 282,845 | 402,795 | 320,965 |
| Other electrical apparatus .. | 832,115 | 509,395 | 123,295 | 143,625 |
| Totals .. .. .. | £2,227,075 | £1,546,200 | £1,106,075 | £924,128 |

It will be seen that both sections of the trade have been seriously affected by the current industrial depression, the imports showing a reduction of £680,875, or over 35 per cent. Twelve of the scheduled items show a decline, and six an increase, the most notable advances being in radio valves and telegraph and telephone instruments. On the export side there is a decrease of £181,947, or about 16½ per cent., every item, except the last one, showing a decline.

## Electric Heating and Cooking Progress in France

The Compagnie d'Electricité de Paris has recently issued an interesting return, summarised in the appended table, showing the number of new installations of electric heating, cooking and other appliances in the French capital during the first three months of the current year and the total of such installations since 1927.

| | First Quarter, 1931. | Total since August, 1927. |
|---|---|---|
| Electric fires of at least 1 kW. .. .. .. .. .. | 143 | 5,864 |
| Complete installations .. .. .. .. .. | 80 | 1,308 |
| Electrically-heated water installations .. .. .. .. | 72 | 398 |
| Electric water heaters .. .. .. .. .. | 203 | 1,737 |
| Domestic cookers .. .. .. .. .. .. | 222 | 1,231 |
| Small domestic appliances .. .. .. .. .. | 7,793 | 69,389 |
| Hotel and institution cooking installations .. .. .. | 1 | 16 |
| Electric ovens for bakers, confectioners, cooked food purveyors, etc. .. .. .. .. .. .. .. .. | 27 | 292 |
| Electric refrigerators .. .. .. .. .. .. | 115 | 854 |
| Industrial electric furnaces .. .. .. .. .. .. | 2 | 38 |

It is pointed out that the above figures do not include any additions to existing installations.

## International Wire Agreement

According to the Berlin *Börsen Zeitung* an agreement has lately been arrived at between the Felten & Guilleaume Carlswerk Gesellschaft, of Mulheim, the American Cable Co., New York, the British Wire Ropes, Ltd., London, the Australian Wire Ropes Co., and a number of Canadian concerns for the interchange of patents and manufacturing licences.

## New Australian Company

A new company, having the title of "Hot Bar, Ltd.," 301, Castlereagh Street, Sydney, has recently been formed with a capital of £1,000 to carry on the business of electrical engineers and producers of "Bakelite" products and heating elements.

**The Floodlighted Pageant Grounds at Bradford**

### Trade Representation in Newfoundland

The Department of Overseas Trade announces that, following the recent strengthening of H.M. Trade Commissioner Service in Canada and Newfoundland by the creation of an additional Trade Commissioner post at Montreal, arrangements have been made whereby more frequent visits to Newfoundland and the Maritime Provinces of Canada will be undertaken than hitherto and in general greater attention paid to the furtherance of United Kingdom trade interests in these areas. Mr. H. F. Gurney, Junior Trade Commissioner at Montreal, has accordingly been assigned the duty of making a special study of questions affecting trade with Newfoundland and the Maritime Provinces of Canada, and he has been given the title of H.M. Trade Commissioner in Newfoundland and the Maritime Provinces of Canada. Mr. Gurney's headquarters will remain at Montreal, where he will continue to assist the Senior Trade Commissioner (Mr. F. W. Field). The arrangements referred to are not intended to supersede the system under which the Department is directly represented in Newfoundland by a resident Imperial Trade Correspondent, and the duties of that post will continue to be performed as hitherto by Mr. H. V. Hutchings, Deputy Minister of Customs, St. John's.

### Battery Manufacture in Canada

The production of storage and dry cell batteries in Canada during 1930 amounted in value to $6,712,080, as compared with $7,757,389 in 1929. There were 27 firms engaged in this industry, with a total capital of $9,309,569, giving employment to an average of 1,189 persons, who received a total of $1,577,787 in salaries and wages. The cost of materials was $3,111,224.

### New Electrical Showrooms

The SOUTH METROPOLITAN ELECTRIC TRAMWAYS & LIGHTING CO., LTD., has opened new showroom premises in High Street, Ewell, Surrey. This is the firm's fourth showroom in the district.

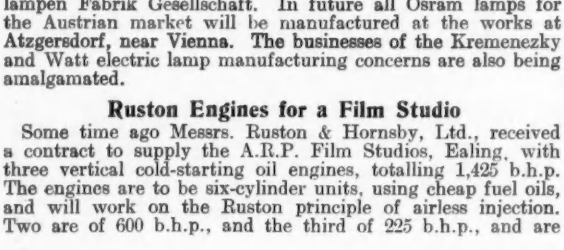
The Irish Free State Electricity Supply Board's new electricity showrooms in Caroline Street, Cork, were officially opened on September 10th by the Lord Mayor, Councillor F. J. Daly. The chairman, Mr. R. F. Brown, and other members of the Board were present.

### Austrian Lamp Amalgamation

An amalgamation has recently been affected of the businesses of the Osram Lampen Gesellschaft, of Vienna, and the Vertex Electrowerk Gesellschaft, of Atzgersdorf, the title of the joint concern being the Osram Oesterreichische Gluhlampen Fabrik Gesellschaft. In future all Osram lamps for the Austrian market will be manufactured at the works at Atzgersdorf, near Vienna. The businesses of the Kremenezky and Watt electric lamp manufacturing concerns are also being amalgamated.

### Ruston Engines for a Film Studio

Some time ago Messrs. Ruston & Hornsby, Ltd., received a contract to supply the A.R.P. Film Studios, Ealing, with three vertical cold-starting oil engines, totalling 1,425 b.h.p. The engines are to be six-cylinder units, using cheap fuel oils, and will work on the Ruston principle of airless injection. Two are of 600 b.h.p., and the third of 225 b.h.p., and are




**A Ruston Engine for Film Work**

to be used to generate all the electricity required in the new Ealing "talkie" studios. The accompanying illustration shows the housing of one of these engines being transported by road from Lincoln to Ealing.

### Social Events

The golf section of Siemens Lamp Works Sports Club, Preston, competed on September 5th for the "A. M. Hicks" prize. A medal round of 18 holes was played on the Ashton Park course under ideal conditions, the winner being Mr. J. N. Aldington, with a score of 79−6=73. Mr. A. L. Allen was runner-up with a card of 87−12=75.

The third annual swimming gala of the Sunco Swimming Club of the Sun Electrical Co., Ltd., was held on Monday evening last at the Holborn Baths, W.C. A large number of the staff and friends were present, and the many exciting finishes aroused considerable enthusiasm. The nineteen events included team races in which the Sunco, G.E.C., A.S.E.A., Critmanco, Philips and Siemens teams took part, while other attractions were displays of ornamental swimming by members of the South London Swimming Club, and diving by members of the Amateur Diving Association. At the conclusion of the events the prizes were presented by Mrs. R. Tweedy-Smith. These included challenge cups presented by Mr. A. G. Beaver and Mr. R. Tweedy-Smith.

### British Auxiliaries, Ltd.

The firm of Messrs. FIAT BRITISH AUXILIARIES, LTD., whose works are at Helen Street, Govan, Glasgow, and whose head office is at 106, Fenchurch Street, London, E.C.3, has recently been reconstituted and renamed "British Auxiliaries, Limited." The reconstituted company has entered into a manufacturing agreement with Messrs. Aktiebolaget Atlas Diesel of Stockholm, and will, therefore, be in a position to offer both British built "Polar-Atlas" and "Fiat" types of Diesel engines for marine and land installations, and for Diesel electric rail cars and locomotives.

### Scottish Electrical Golfers

After the usual monthly meeting of the Scottish Electrical Manufacturers' and Factors' Association which was held in Glasgow on September 8th, a large number of members proceeded to Cathcart Castle Golf Club where an enjoyable game took place. The competition was one against bogey, and Mr. Raymond Fawcett, of the Northern Steel and Hardware Co., who is vice-chairman of the Association, was complimented on the arrangements made. The prizewinners were: First prize, Mr. J. H. Chalmers, of Messrs. Andrew Chalmers and Mitchell; second prize, Mr. John Paterson, of Messrs Paterson & Service; third prize divided between Mr. J. M. Rankin, of Messrs. Watt & Co., and Mr. A. W. Kilpatrick, of the Central Electric Co. The Craigpark Electric Cable Co., Ltd., presented three dozen "Whiteflyer" golf balls for the use of the players. The first prize (golf balls) was given by British Insulated Cables, Ltd., and the Holland House Electrical Co., Ltd., and Messrs. Andrew Chalmers & Mitchell also contributed to the prize list.

### The British Industries Fair

A huge silhouette of Britannia calling the world's buyers to the British Industries Fair will shortly make its appearance on hoardings all over the world. It has been printed in all sizes up to sixteen-sheet. Ten languages have been used for the letterpress.

The German State Railways have announced a reduction of 25 per cent. in fares for trade buyers travelling to the Fair, and leading Swedish and Finnish shipping companies have also announced reduced fares. The Foreign Office has again agreed to grant free visas to trade buyers coming to Britain for the Fair, and arrangements are being made by the Department of Overseas Trade to make all travel concessions widely known.

### Uruguayan Customs Duties

In a recent circular issued by the Department of Overseas Trade it was stated that the duty on certain classes of merchandise imported into Uruguay was increased by 50 per cent. for one month from August 27th, but that the increase would not be applied to British goods. This latter statement was made on the strength of assurances given to H.M. Representative by responsible Uruguayan authorities, but those assurances have not been confirmed by the National Council. A Decree, however, has now been passed limiting the increase in the case of goods from the United Kingdom and certain other countries to 25 per cent., and providing for a refund of duties paid in excess of that amount.

### For Sale

Rawtenstall Electricity Department has for disposal a number of d.c. motors of from ¾ h.p. to 20 h.p.

A large stock of gramophones, talkie apparatus, etc., will be sold by auction on September 22nd, at 114, Euston Road, London, N.W.1.

(See our advertisement pages to-day.)

### Trade Announcements

THE WHOLESALE FITTINGS CO., LTD., has moved its Bristol branch to larger premises at 83, Victoria Street, Bristol. At the London head office, 23, 25, 27, and 37, Commercial Street, E.1, a showroom has been set aside entirely for the display of wireless sets.

W. H. ROSSITER & Co., electrical and radio engineers, of Bradford-on-Avon, have removed to larger premises at 8, St. Margaret's Street.

MR. W. J. ARTERTON, 3, Lime Avenue, Albert Promenade, Loughborough, has been appointed agent for the whole of the specialities of Messrs. Matterson, Ltd., for the counties of Leicestershire, Northamptonshire and Lincolnshire, and Mr. J. C. Campbell, of 58, Sandford Grove Road, Nether Edge, Sheffield, has been appointed agent for the West Riding of Yorkshire and the counties of Derbyshire and Nottinghamshire.

MR. H. W. ELSWORTH, registered electrical contractor, has opened new showroom premises at 16, Parkhurst Road, Bexhill-on-Sea.

### Wages in the Electricity Supply Industry

A critical position has arisen with regard to wages in the electricity supply industry, according to a report issued last week by Mr. James Rowan, general secretary of the Electrical Trades Union. Mr. Rowan states that in a ballot of members held recently less than four per cent. voted in favour of the employers' proposal to reduce wages by a halfpenny an hour. Four areas refused to vote, largely because various undertakings in their areas had assured them that they were not prepared to put the proposed reduction into operation. No ballot was made in the north-east coast area, as this district

claimed that it had never been a party to the cost-of-living sliding-scale agreement and therefore would require special notice. When the result of the voting was announced to the full joint council, the only question asked was as to whether the Union was prepared to go into arbitration. On receiving a negative reply, the employers stated that there was no need for any further discussion and that they would take their own action.

## New Catalogues and Lists

BRITISH INSULATED CABLES, LTD., Prescot, Lancs.—A well-illustrated brochure, containing tabular technical data, descriptive of cables specially designed to withstand exacting conditions on board ships. To avoid lead-sheath cracking due to vibration, the metal may be alloyed, or other means of protection may be employed, such as the special rubber-insulated "H.R." type of cable which the company has developed. Of ships recently fitted throughout with B.I. cables, there is over 100 miles of the "H.R." type aboard the m.v. *Britannic*.

A. C. COSSOR, LTD., Highbury Grove, London, N.5.—A complete list of "Cossor" valves, together with a leaflet on pentodes and metallised valves.

RADIO INSTRUMENTS, LTD., Purley Way, Croydon.—A leaflet and showcard illustrating and describing the new "Dux" l.f. transformer. Also a number of leaflets and catalogues giving details of other new "R.I." products, including "Stenode Radiostat" receivers, mains transformers, and volume controls.

THE MULLARD WIRELESS SERVICE CO., LTD., Mullard House, Charing Cross Road, London, W.C.2.—A showcard in five colours relating to "Mullard" a.c. mains valves.

OZONAIR, LTD., St. Leonard's Street, S.W.1.—An illustrated booklet describing the "Ventex" air filter.

BUCK & HICKMAN, LTD., 2, 4 and 6, Whitechapel Road, London, E.1.—Two coloured leaflets dealing with "Parker-Kalon" hardened self-tapping sheet-metal screws.

HEYES & CO., LTD., Water-Heyes Electrical Works, Wigan.—A folder (LF. 2), illustrating and describing "Wigan" prismatic explosion-proof fittings, "Lacent" fittings, etc. Also the September issue of the "Wigan Review."

L. G. HAWKINS & CO., LTD., 30-35, Drury Lane, Kingsway, London, W.C.2.—The September number of the "Link," containing a special article on electric waffle irons. Also an illustrated leaflet describing the Pye "Q" portable radio receiver.

BROOK MOTORS, LTD., Huddersfield.—A folder showing a sectional model of a 20 h.p. motor on exhibition at the Science Museum, South Kensington.

SIEMENS BROTHERS & CO., LTD., Woolwich, London, S.E.18.—A 40-page illustrated catalogue (597A) of "Siemens" remote control equipment.

METROPOLITAN-VICKERS ELECTRICAL CO., LTD.—An illustrated brochure descriptive of the properties, composition, and structure of a new aluminium-silicon M.V. "C" alloy which has been evolved by the company.

J. DYSON & CO., LTD., 5 & 7, Godwin Street, Bradford.—An illustrated and priced pamphlet describing the construction of the Westinghouse vacuum cleaner.

G.W.B. ELECTRIC FURNACES, LTD., Elecfurn Works, North Road, Holloway, N.7.—A card of instructions, entitled "Practical Hints for Use in the Hardening Shop," giving information with regard to the method of packing carburising boxes, reheating, second reheats, hardening, quenching, etc. The card is varnished, eyeletted, and strung for hanging on the walls of hardening shops.

The ELECTRICAL APPLIANCES, LTD., Blackpool.—A folder relating to the company's "snap"-type plugs, switch-plugs, junction boxes, etc.

KERSON'S MANUFACTURING CO., LTD., 36, Wainwright Street, Aston, Birmingham.—A revised price list (P.L. 101), of "Kerson" switches, switchplugs, lampholders, ceiling roses, fuses, etc. Tables are included giving useful cable formulæ, approximate fusing currents and wires in free air, motor data, lumen ratings, and dimensions of standard lamps, illumination intensities, etc.

THE IGRANIC ELECTRICITY CO., LTD., 149, Queen Victoria Street, London, E.C.4.—Advance information regarding 1931-32 radio season. A number of price reductions and new lines are announced.

The BRITISH ALUMINIUM CO., LTD., Adelaide House, London, E.C.4.—Booklet No. 343, dealing with aluminium bronze die castings. A number of excellent illustrations in sepia are included.

FALK, STADELMANN & CO., LTD., 83 and 93, Farringdon Road, London, E.C.1.—Catalogues Nos. 646 and 647, giving full particulars, with illustrations, of the new season's "Efesca" electric fires and cooking and domestic appliances.

TUNGSRAM ELECTRIC LAMP WORKS (GREAT BRITAIN), LTD., 72, Oxford Street, London, W.1.—A list giving prices and particulars of "Tungsram" electric lamps.

ARTHUR PREEN & CO., LTD., Golden Square, Piccadilly Circus, London, W.1.—An illustrated and priced catalogue of "Formo" radio components.

THE DRAYTON REGULATOR AND INSTRUMENT CO., LTD., West Drayton, Middlesex.—An announcement of the introduction of the new "Drayton V.T." regulator, selling at greatly reduced prices.

BENHAM & SONS, LTD., 66, Wigmore Street, London, W.1.—A showcard illustrating the "Electro-Vapour" radiator.

SIEMENS ELECTRIC LAMPS AND SUPPLIES, LTD., 38 and 39, Upper Thames Street, London, E.C.4.—Two leaflets giving particulars of "Siemens" floodlighting units. Illustrated and priced.

R. F. WINDER, LTD., Belgrave Electrical Works, Leeds.—The company's September catalogue of surplus new and second-hand electrical material.

THE SKEFKO BALL BEARING CO., LTD., Luton.—The quarterly issue of the "Ball Bearing Journal," in which are contained articles on ball bearing fits and international tolerance system, hydraulic turbines with "S.K.F." bearings, propeller thrust bearings for ships, bearings for quarrying machines, etc.

## Electrical Boy Scouts

A party of Harrogate scouts has just returned from a tour in France and Switzerland. A number of them were apprentices in the electrical and building trades and they paid special attention to electrical developments in the countries visited. The lads were in charge of their scoutmaster, Mr. J. Benson, who is connected with Messrs. R. Falshaw, Ltd., the Harrogate electrical engineers and contractors.

## Electricity Propaganda at a Carnival

At a recent carnival held in Walsall, in aid of the local hospital, the Corporation Electricity Department took advantage of the occasion to draw attention to the domestic advantages of electricity. The accompanying illustration shows the Department's vehicle on which was mounted transmission towers and various electrical appliances, the tableau being backed up by some telling slogans.

**The Walsall Electricity Department's Tableau**

## Italian Radio Duties

The *Board of Trade Journal* states that as a result of an exchange of notes between Italy and Switzerland certain modifications have been made in the Conventional duties of the Italian customs tariff in respect of wireless, telegraph and telephone apparatus. The duty now payable on such apparatus is 880 paper lire per 100 kilogs.

## Book Notices

A very attractive publication, entitled "Drawing Office Progress," has just reached us from the Drawing Office Material Manufacturers' and Dealers' Association. In addition to a list of members the 84 pages contain details of the policy of the Association, together with interesting articles on drawing office processes and equipment, and the psychology of the draughtsman. Excellent coloured and sepia plates of shipbuilding and engineering subjects are also included.

"Kingston's Continental Price Conversion Tables," by A. G. Kingston. Pp. 79. London: Kingston Translations Institute. Price 4s. net. These useful tables give the price equivalents in the currencies of Austria, Belgium, Czechoslovakia, Denmark, Estonia, Finland, France, Germany, Italy, Sweden, and practically all other countries on the Continent for sterling prices as well as equivalents in sterling for goods quoted in the same foreign currencies. The latter tables should prove invaluable to buyers of Continental goods.

"A Register of Civilian Aircraft," by W. O. Manning and R. L. Preston. Pp. 60, London: Sir Isaac Pitman and Sons, Ltd. Price 2s. 6d. net. A complete list of all civilian aircraft registered in Great Britain, together with the names and addresses of their owners.

"The Electric Trolley 'Bus," by R. A. Bishop. Pp. xi+193; figs. 57. London: Sir Isaac Pitman and Sons, Ltd. Price 12s. 6d. net.

## Hungarian Tariff Modifications

According to the *Board of Trade Journal*, various electrical appliances are affected by alterations in the Hungarian customs tariff provided for by a decree dated July 18th. The increased duties are applied as from August 5th in the case of goods despatched before July 19th, and the following new scale of import duties has come into force:—Dynamos, electric motors, transformers and parts thereof, electrical machinery whether or not inseparably combined with mechanical construction (excluding vacuum cleaners, electric parquet brushes and parts thereof):—5,000 kilogs or over in weight, 100 kronen per 100 kilogs; between 1,000 and 5,000 kilogs, 125 kronen; between 250 and 1,000 kilogs, 140 kronen. The new

duties on starting apparatus, resistance regulators, and other electrical appliances not specially mentioned in the tariff, switchboards, electrical installation material, and finished parts thereof are as follows:—200 kilogs or over, 135 kronen per 100 kilogs; between 50 and 200 kilogs, 155 kronen; between 5 and 50 kilogs, 200 kronen; between 250 grammes and 5 kilogs, 275 kronen; less than 250 grammes, 300 kronen.

## German Steel Merger

The Berlin correspondent of the *Financial News* reports that the Mitteldeutsche Stahlwerke A.G. (Central German Steel Works) and the Maximilianhütte A.G. have effected a merger of interests by agreeing to pool their net profits.

## Recent Contracts

Messrs. Glenfield & Kennedy, Ltd., Kilmarnock, have been given the contract for the manufacture and erection of all the water control equipment required on the new graving dock which is at present under construction at Southampton. The contract includes 29 electrically-operated sluice valves varying from 10ft. to 3ft. in diameter.

Messrs. Clark Chapman & Co., Ltd., Gateshead-on-Tyne, have completed a £17,000 contract for Soviet Russia for six electrically-driven winding engines. The electrical apparatus has been supplied by the General Electric Co., Ltd.

The Newcastle-upon-Tyne Electric Supply Co., Ltd., has placed a contract with Messrs. Richardsons, Westgarth & Co., Ltd., for three turbines to be erected at the Supply Co.'s Bankfoot (near Crook) power station.

Duffield Coal Products, Ltd., has received an order from South Africa for gyro-pulveriser fuel equipment for three Babcock & Wilcox boilers, each of 17,000 lb. per hour normal rating. The compactness and adaptability of the Gyro system is such that the company is supplying for these units plant capable of raising the evaporation to 40,000 lb. per hour per boiler.

## D.O.T. Trade Memoranda

A confidential memorandum on methods of trading with the United States, prepared by the Commercial Secretary to the Washington Embassy, has been received in the Department of Overseas Trade, and issued to firms whose names are entered upon its Special Register. A similar memorandum relating to the British West Indies and contiguous British territories, compiled from information furnished by H.M. Trade Commissioner in Trinidad, has also been issued by the Department.

British firms desirous of obtaining a copy of these memoranda should apply to the Department, 35, Old Queen Street, S.W.1. Reference numbers, C.X. 3647 and C.X. 3606, should be quoted, respectively.

## Edison Accumulators

We are informed that the Edison Storage Battery Company of Orange, N.J., whose distributors in this country are Edison Storage Battery Distributors, Ltd., have recently been granted the use of the name "Edison" as a trade mark applying solely to their accumulators. We learn that the granting of the trade mark is a result of the proceedings which recently occupied the English Law Courts.

## A "Vac-Tric" Advertising Film

A trade show was given last week at Bush House, Aldwych, London, of a talking film, entitled "Hygiene in the Home," which has been prepared by Vac-Tric, Ltd., to advertise its vacuum cleaners. The film, which gives a complete demonstration of the various uses of the cleaner and attachments, is expected to be ready for public exhibition in the Midlands, Lancashire and Yorkshire towards the end of October, and will be shown in cinemas throughout the country within the next twelve months.

## Czecho-Slovakian Electrical Trade

During the six months ended with June last, electrical machinery and apparatus to a value of £45,850 was exported from Czecho-Slovakia to England, as compared with £34,420 in the corresponding half of 1930. During the same period the imports of similar materials from England into Czecho-Slovakia declined from £16,530 to £10,490.

## New French Companies

Among the new concerns recently formed in France are the Société Hydro-Electrique de Bissorte, Paris (23 *bis* Rue Balzac), capital £160,000, to establish hydro-electric plants on the River Bissorte; La Société des Forces Motrices de la Maronne, Paris (3, Rue Moncey), £200,000, to establish hydro-electric plants in the Departments of Correze and Cantal; La Société Marocaine d'Applications Electriques Paris (3, Rue de Messine), to carry on an electrical engineering business in Morocco; La Compagnie Générale d'Electricité des Iles d'Or, Paris (15 *bis* Rue Cimarosa); La Société des Ateliers de Constructions Electriques de Malakoff (A.C.E.M.), Paris (92, Rue Laugier), capital £60,000; La Société Hydro-Electrique de Saint Georges-de-Commiers, Grenoble, £32,000; and La Société Centrale d'Exploitations Electro-hydrauliques, Paris (6, Rue d'Aumale).

## Swedish Electrical Trade

The Commercial Counsellor to H.M. Legation at Stockholm, has prepared for the Department of Overseas Trade a report dealing with the trade of Sweden for the first six months of 1931, and the present economic situation. This states that the pronounced decline from the high level of activity which Swedish industry had reached in 1929, occurred in the latter months of last year, and this downward movement was accelerated during the period under review. Statistics show that the export of telegraph and telephone material increased, but almost every other item in the machinery group records a substantial falling off. Thus the value of internal combustion engines exported declined from 10,232,000 kr. to 6,282,000 kr.; electric generators, motors and transformers from 7,992,000 kr. to 5,499,000 kr.; electric fans and vacuum cleaners from 7,088,000 kr. to 4,763,000 kr., etc. Dealing with railways, the report states that, encouraged by the success of the electrification of the Stockholm-Gothenburg line, the State Railway Administration is proceeding with the electrification of the line from Stockholm to Malmo and Trälleborg—the terminus of the Baltic Ferry. This work, which, with the connecting branches will cover about 534 miles, is expected to be completed by the end of 1933, and it is estimated that it will ultimately involve a reduction of over 120,000 tons in the annual purchase of coal by the Railway Administration. Schemes for the electrification of further sections of the State Railways are under consideration.

## New German Company

With the title of the Osram-Philips Gesellschaft, a new concern has just been formed in Berlin with a capital of £50,000 to carry out the joint arrangement between the German Osram Co. and the Dutch Philips Co. with regard to neon lights.

## Hints for Commercial Visitors

A further memorandum of the "Hints for Commercial Visitors" series, published by the Department of Overseas Trade relates to Jugo-Slavia (No. C3,636). It includes general information useful to travellers, industries of the provinces of the Kingdom, and particulars of travelling facilities.

Another memorandum of this series (C. 3642) deals with Bulgaria, and contains useful information with regard to trade, customs, etc., as well as particulars of transport and hotel facilities.

## Price Reductions

The General Electric Co., Ltd., announces that the prices of "Magnet" wireless accumulators have been reduced.

## Prices of Materials

The following prices are only general, and they may vary according to quantities and other circumstances:—

| CHEMICALS, Etc. | Price Sept. 15th. | Fortnight's Inc. or Dec. |
|---|---|---|
| *a* Acid, Oxalic .. .. .. .. per lb. | 5½d. | — |
| *a* Ammoniac, Sal .. .. .. per ton | £60 | — |
| *a* Ammonia, Muriate (large crystal) .. ,, | £52 | — |
| *a* Borax .. .. .. .. .. ,, | £17 | — |
| *a* Copper Sulphate .. .. .. ,, | £25 10s. | — |
| *a* Potash, Chlorate .. .. .. per lb. | 3d. to 4d. | — |
| *a* ,, Perchlorate .. .. .. ,, | 5½d. | — |
| *a* Shellac T.N. .. .. .. per cwt. | £4 5s. | — |
| *a* Sulphur Commercial .. .. .. ,, | £11 | — |
| *a* ,, Roll .. .. .. ,, | £11 | — |
| *a* Soda, Chlorate .. .. .. .. per lb. | 3d. | — |
| *a* ,, Crystals .. .. .. per ton | £5 to £5 5s. | — |
| *a* Sodium Bichromate, casks .. .. per lb. | 3½d. | — |
| **METALS, Etc.** | | |
| *b* Aluminium, Ingots .. .. .. per ton | £85 to £90 | — |
| *b* ,, Wire .. .. .. per lb. | 1/1 to 1/9 | — |
| *b* ,, Sheet and Foil .. .. ,, | 1/1 to 2/9 | — |
| *b* Babbits Metal and Anti-friction Metals— | | |
| Grade I .. .. .. per ton net | £112 | £5 dec. |
| Grade II .. .. .. .. ,, | £81 | £3 dec. |
| Grade III .. .. .. .. ,, | £48 | — |
| *c* Brass (rolled metal 2" to 12" basis) .. per lb. | 6¼d. | ½d. dec. |
| *c* ,, Tubes (solid drawn) .. .. ,, | 8¾d. to 9d. | ½d. dec. |
| *c* ,, Wire, basis .. .. .. ,, | 7¾d. | — |
| *c* Copper Tubes (solid drawn) .. .. ,, | 9½d. | ½d. dec. |
| *g* ,, Bars (best selected) .. .. per ton | £62 | £2 dec. |
| *g* ,, Sheet .. .. .. .. ,, | £62 | |
| *g* ,, Rod .. .. .. .. ,, | £62 | |
| *d* ,, (Electrolytic) Bars .. .. ,, | £38 | — |
| *d* ,, ,, Sheets .. .. ,, | £143 10s. | — |
| *d* ,, ,, Wire Rods .. ,, | £48 | — |
| *d* ,, ,, H.C. Wire .. per lb. | 6 1/16d. | 1/16d. dec. |
| *f* Ebonite Rod .. .. .. .. ,, | 1/3 to 1/6 | — |
| *f* ,, Sheet .. .. .. .. ,, | 1/3 to 1/6 | — |
| *n* German Silver Wire .. .. .. ,, | 2/1 | — |
| *h* Gutta-percha, fine .. .. .. ,, | nom. | — |
| *h* India-rubber, Para fine .. .. ,, | 3½d. | ½d. dec. |
| *i* Iron, Pig (Cleveland No. 3) .. .. per ton | 58/6 | — |
| *l* ,, Wire, galve. No. 1, P.O. qual. ,, | £20 | — |
| *g* Lead, English pig .. .. .. ,, | £12 | £1 dec. |
| *g* Mercury .. .. .. .. per bot. | £16 to £16 2s. 6d. | 2/6 dec. |
| *e* Mica (in original cases) small .. per lb. | 6d. to 3/6 | — |
| *e* ,, ,, medium .. ,, | 4/- to 8/- | — |
| *e* ,, ,, large .. ,, | 8/6 to 17/6 & up | — |
| *p* Phosphor Bronze, plain castings .. ,, | 1/1½d. | — |
| *p* ,, ,, drawn bars & rods ,, | 10½d. | ½d. dec. |
| *p* ,, ,, rolled strip & sheet ,, | 10½d. | 1d. dec. |
| *p* ,, ,, wire .. .. ,, | 11½d. | ½d. dec. |
| *o* Platinum .. .. .. .. per oz. | £8 | — |
| *d* Silicium Bronze Wire .. .. .. per lb. | 9½d. | — |
| *r* Steel, magnet, in bars .. .. ,, | 7½d. | — |
| *g* Tin, Block (English) .. .. .. per ton | £116 10s. to £117 10s. | £5 to £6 dec. |
| *n* ,, Wire, Nos. 1 to 16 .. .. per lb. | 2/10 | — |

Quotations supplied by:—

*a* G. Boor & Co.
*b* The British Aluminium Co., Ltd.
*c* Thos. Bolton & Sons, Ltd.
*d* Frederick Smith & Co.
*e* F. Wiggins & Sons.
*f* India-Rubber, Gutta-Percha and Telegraph Works Co., Ltd.
*g* James & Shakespeare.
*h* Edward Till & Co.
*i* Bolling & Lowe.
*l* Richard Johnson & Nephew, Ltd.
*n* P. Ormiston & Sons.
*o* Johnson, Matthey & Co.
*p* C. Clifford & Son, Ltd.
*r* W. F. Dennis & Co.

## Bankruptcy Proceedings

**Henry Evans,** electrical factor, 60, Berners Street, W.—The public examination of this debtor was held in the London Bankruptcy Court on September 8th before Mr. Registrar Stiebel, his statement of affairs showing liabilities of £962, of which £258 are expected to rank, and no assets. It appeared that except for a period of service with the R.A.F. the debtor was employed by electrical engineers until 1926. He then obtained the position of sales manager to the petitioning creditors under an agreement whereby he was to receive £6 a week plus a commission of 2 per cent. on sales exceeding £15,000 a year. Against such commission he was allowed to draw £2 a week in anticipation. In December, 1928, he resigned the position, and, later, proceedings were brought against him for repayment of £140 alleged to be commission overdrawn. He defended the action and counter-claimed for damages, but in March last judgment and costs were awarded against him, and the proceedings in bankruptcy ensued. The examination was concluded.

**Norman Sutton,** trading, as Sutton's Wireless Service, 169, High Street, East Wallsend, Northumberland, wireless dealer. —The receiving order in this matter was made on the debtor's own petition. The first meeting of creditors was held recently at the Official Receiver's office, 81, St. Mary's Place, Newcastle-upon-Tyne. According to the statement of affairs there were liabilities of £381 and assets of £171, after deducting preferential claims of £14, thus leaving a deficiency of £210. The following are creditors :—

| | £ | | £ |
|---|---|---|---|
| Brownie Wireless Co., Ltd. | 49 | East London Rubber Co. ... | 78 |
| Cossor, A. C., Ltd. ... ... | 30 | Philips Lamps, Ltd. ... | 54 |

**C. Foulston,** motor and electrical engineer, 18, Wollaston Road, late Mill Road Garage, both Cleethorpes.—The receiving order was made recently on the debtor's own petition. According to the statement of affairs filed there are liabilities amounting to £288, against assets of £33. The first meeting of creditors was held at the Official Receiver's office, St. Mary's Chambers, Great Grimsby, when the case, being a summary one, was left in the hands of the Official Receiver as trustee of the estate.

**R. E. Pearcey,** motor and electrical engineer, 105, Arthur Street, Withernsea, East Riding, Yorks.—The first meeting of creditors was held recently at the Official Receiver's office, 37, Scale Lane, Hull, when the statement of affairs showed liabilities of £261, against assets of £26, leaving a deficiency of £236. The failure was attributed by the debtor to depression in trade. The matter was left in the hands of the Official Receiver as trustee.

**F. E. Saunders,** electrical and mechanical engineer, 10a, Page Street, Westminster, S.W.—Receiving order made September 8th, on creditor's own petition. First meeting, September 21st, and public examination, November 24th, both at Bankruptcy Buildings, Carey Street, W.C.

**G. Clark & C. W. Pullen** (Northern Motor Sign Co.), electrical sign specialists, 9, Oxford Street, Manchester.—Receiving order made September 9th, on debtors' own petition.

**R. Dring,** electrical engineer, 257, Freeman Street, Great Grimsby.—Last day for receiving proofs for dividend, September 29th. Trustee, Mr. C. Turner, 155, Norfolk Street, Sheffield.

**R. J. Fletcher,** electro-chemical engineer, 76, Gleneagle Road, Streatham, S.W.—Last day for receiving proofs for dividends, September 25th. Trustee, Mr. C. R. Waterer, 29, Russell Square, W.C., Official Receiver.

**C. W. Whitle,** electrical sales engineer, 45, Fife Road, Darlington.—First and final dividend of 9d. in the £, payable September 3rd at 80, High Street, Stockton-on-Tees.

**P. A. Franks,** electrical engineers' contractor, 5b, Bedford Square, Loughborough, Leicestershire.—This debtor appeared at the Castle, Leicester, on September 11th for his public examination. He had prepared a statement of affairs which disclosed a deficiency of £182.

**W. P. Barnell,** electrical engineer, 25a, Sheep Street, Northampton.—Last day for receiving proofs for dividend, September 22nd. Trustee, Mr. T. Bengough, 6, The Parade, Northampton, Official Receiver.

**J. G. Roger** (Radio Wants), wireless engineer, Butter Market Chambers, Butter Market, Ipswich.—First and final dividend of 1s. 1½d. in the £, payable September 16th, at 5, Arcade Street, Ipswich.

## Company Liquidations

**Whitfield Electrical Co., Ltd.**—Liquidator, Mr. T. Gourlay, Official Receiver, released September 3rd.

**Aldwych Electrical Co., Ltd.**—Meetings, October 8th, at 40-43, Norfolk Street, W.C.2, to receive an account of the winding-up by the liquidator.

**Postermatic, Ltd.**—Winding-up voluntarily. Liquidator, Mr. H. S. Mayer, 19, Buckingham Street, W.C.

**Dominion Radio & Gramophones, Ltd.**—Particulars of claims by November 9th to the liquidator, Mr. T. C. Clayton, 9, Albert Square, Manchester.

**C. H. Roberts & Co., Ltd.**—Meetings at 200, Gresham House, Old Broad Street, E.C., on October 19th, to receive an account of the winding-up by liquidator, Mr. C. F. Saffery.

## Meetings of Creditors

**Thorpe & Thorpe, Ltd.**—Creditors' meeting, September 17th, at 3 and 4, Clements Inn, W.C.

**San Luis (Mexico) Tramways, Ltd.**—Creditors' meeting, October 5th, at 8, Arthur Street, King William Street, E.C.

# Electricity Supply

## Lighting, Domestic, Power

**Australia.**—NORTHERN QUEENSLAND SCHEME.—With a view to providing cheap electricity for various centres in Northern Queensland, the Government of Queensland has decided to make available £100,000 in instalments to the Barron Falls Hydro-Electricity Board for the purpose of harnessing the Barron Falls.

**Barmouth.**—SPECIAL ORDER.—Electricity Distribution of North Wales and District, Ltd., is applying to the Electricity Commissioners for a Special Order authorising it to supply electricity in the urban district of Barmouth and the parishes of Llanaber, Llanddwywe-is-y Graig township, and Llanenddwyn in the rural district of Dolgelly.

**Belgian Congo.**—ELECTRICAL PROGRESS.—The Société Colonial d'Electricité, which is responsible for the supply of electricity in the Leopoldville district, reports that a steady increase is taking place in the demand for power supplies and that during the past financial year the length of the h.p. distribution system was increased to 13½ miles and the l.p. mains to nearly 20 miles.

**Bradford.**—MAINS EXTENSIONS.—The Corporation Electricity Committee has voted £20,000 for mains extensions.

**Burnley.**—SUPPLY TO HIGHAM.—At a recent meeting of the Rural District Council a letter was received from Higham Council asking for a supply of electricity. It was intimated that Lancashire Electric Power Co. contemplated carrying a main through the town from the Padiham power station, and it was urged the Rural Council should try and obtain a supply.

PROGRESS DURING AUGUST.—During the month of August the Corporation Electricity Department installed seventy-two appliances (including radiators and cookers) on hire or hire-purchase terms. New consumers totalled ninety-two, of which thirty were connected on the rateable-value system. The number of houses wired under the hire-purchase scheme was 362, and through the slot meter 1,720.

**Burton-on-Trent.**—LOAN SANCTIONED.—The Corporation Electricity Committee has obtained sanction to a loan of £50,000 for mains and services.

MAINS EXTENSIONS.—Mains extensions are to be carried out at a cost of £250 to supply Grangewood House, Netherseal.

**Continental.**—GERMANY.—A return just to hand shows that the output of the 122 principal electric supply undertakings in Germany during June last only amounted to 1,093,300,000 kWh —the lowest monthly total so far this year—bringing the aggregate production for the first six months of the year to 7,168,500,000 kWh, as compared with 8,146,500,000 kWh in the corresponding period of last year.

**Driffield (Yorks).**—INAUGURATION OF SUPPLY.—The new electricity supply for Driffield will be inaugurated on September 21st. Most of the cables are underground.

**Douglas (I. of M.).**—ADDITIONAL GENERATING PLANT REQUIRED. —At a recent meeting of the Corporation Electricity Committee the electrical engineer reported that in order to meet the steadily increasing demand, it would be necessary to install further generating plant. He was authorised to report further as to the plant required.

MAINS EXTENSIONS.—Mains extensions are to be carried out in Onchan at a cost of £420.

**East Grinstead.**—LOAN SANCTIONED.—The Urban District Council has received sanction to a loan of £10,000 for electricity purposes. The Electricity Commissioners have deferred sanction to an additional loan of £9,000 for mains and services pending further particulars.

**Hebburn-on-Tyne.**—STREET LIGHTING.—The Urban District Council is to erect a further number of electric street lamps.

**Ilkley.**—SUPPLY TO DENTON.—The Urban District Council has decided to apply to the Electricity Commissioners for an order to supply electricity in the township of Denton.

**London.**—BERMONDSEY.—The Borough Council Electricity Committee has obtained sanction to the borrowing of £25,000 for mains and services, £10,000 for meters, and £1,150 for wiring installations.

SUPPLY FAILURE.—A large area of Southern London was without an electricity supply for several hours last Monday, owing to the failure of one of the main supplies of the County of London Electric Supply Co., Ltd.

**Macclesfield.**—PROPOSED PURCHASE OF ELECTRICITY UNDERTAKING.—Regarding the proposed purchase by the Corporation of the electricity undertaking, the Electricity Commissioners have received a letter from Mr. H. W. Howard, managing director of the supply company, stating that the acquisition of the undertaking by the Corporation would not be in the best interests of electrical development, and that the cutting off of the borough from the outlying districts would not facilitate the proposed extensions. He asserted that the whole of the ratepayers were against the purchase. The Commissioners were requested, before giving final consent to the proposal, to hold a local inquiry, and it was suggested that the Corporation should give the company a further extension of twenty-one years, in which case the company would be prepared to meet the Corporation, and to offer certain reductions.

**Manchester.**—LIGHTING OF SANATORIA.—The Corporation Health Committee is to improve the electric lighting at Baguley Sanatorium at a cost of £1,088. Electric lighting is also to be installed at Rose Hill Convalescent Home at a cost of £800.

**Nigeria.**—ELECTRICAL DEVELOPMENT.—Interesting information with regard to the state of the electricity supply industry in the country is included in the 1930 "Report on Nigeria," published by H.M. Stationery Office (price 1s. 6d.). In connection with the generating plant in the power station at Lagos, it is stated that various improvements have been carried out which will effect a considerable reduction in generating costs, and that extensive alterations to the distribution system have been taken in hand to meet the growing demands and the general improvement of the street lighting system in the city. For 1930 the revenue from the Lagos undertaking amounted to £50,052, as compared with £50,440 in the preceding year, the slight decrease being due to a reduction in the charges for electricity. The power station at Port Harcourt has been in operation since March, 1929, and now supplies some 370 consumers. A supply from the new power station at Kaduna was available for waterworks pumping in January, 1930, but the completion of the distribution system was held up by the delay in the arrival of the construction staff, electricity for lighting purposes not being forthcoming till June. The Kano power station was completed and handed over to the Native Administration for operation in August last year. Further investigations were carried out in connection with the electricity schemes at Abeokuta, Ibadan, and Jos.

**Preston.**—CORRECTION.—In our last issue we stated that the Corporation Electricity Department showed a net deficiency of £35,580 for the year ended March 31st last. We regret that this was incorrect, the Department having, in fact, made a surplus on the year's working of £18,256.

**Rochdale.**—TEMPORARY CLOSING OF GENERATING STATION.—Finding it is more economical to purchase bulk supplies from the Lancashire Electric Power Company, the Corporation Electricity Committee has temporarily closed down its Dane Street generating station, as a measure of economy. It was announced at a recent meeting of the Town Council that the Committee felt that this was a desirable step to take, and regretted having to displace certain members of the mechanical staff. The distribution staff, however, was almost fully employed, as there was nearly the same amount of work to do as formerly.

**South Africa.**—GRAAFF-REINET APPROVES ELECTRICITY LOAN.—A poll taken recently on the proposal of the Graaff-Reinet Municipality to raise a loan of £30,000 for the change-over of the supply system from d.c. to a.c. and the erection of a new power station, resulted in a large majority of property owners voting in favour.

NEW ELECTRICITY SCHEMES.—The ratepayers of Paarl are to be asked by the Town Council to sanction the expenditure of £7,000 on mains and transformers. Upington Municipality also proposes to borrow £8,700, part of which is for additional plant at the power station.

**Southampton.**—YEAR'S WORKING.—We have received from Mr. W. G. Turner, borough electrical engineer, a copy of his annual report, together with a statement of accounts of the electricity undertaking for the year ended March 31st last. The total revenue amounted to £282,806, as compared with £272,119 in the preceding year, while the working expenditure decreased from £161,693 to £156,128. There was a gross profit of £126,678, as against £110,426, and after providing for capital and other charges, there remained a net profit of £16,062, as compared with £15,570 in 1929-30. A sum of £5,000 was contributed to the general rate fund. During the year £187,713 was spent on capital account, making a total of £1,428,254 now spent on the undertaking. Sales of electricity increased from 37,906,379 to 40,736,561 kWh, and the maximum demand from 17,730 to 19,530 kW. A supply to the Winchester Corporation for use in the parishes of Compton and Twyford was made available in May, 1930, and an 11,000-V feeder from the generating station to Eastleigh was put into commission in the following June. In November a supply was inaugurated to the village of West End.

**Southport.**—YEAR'S WORKING.—Good progress and a satisfactory surplus as a result of the year's trading is again disclosed in the report of the borough electrical engineer, Mr. E. Moxon, for the twelve months ended March 31st last. Although reductions amounting to £2,422 were made in the charges for electricity and meter rents, the total revenue increased from £97,004 to £102,917, the working expenditure amounting to £48,132 as against £43,881. The gross profit rose from £53,122 to £54,785, and to this was added an unemployment grant of £671, making a total of £55,456 available. Loan charges, income tax, &c., absorbed £39,479 and there was a net surplus of £15,977, as compared with £14,704 in the preceding year. During the period under review £34,576 was spent on capital account, bringing the total capital expenditure to £694,431. There was an increase of 1,466,859 kWh in the sales of electricity, the total energy sold amounting to 14,455,531 kWh; the maximum demand was 7,150 kW, as against 6,450 kW. The average price obtained per kWh fell from 1.70d. to 1.64d. During the year the number of consumers increased by 771, making a total of 10,222 now connected. There was, however, little demand for installations on deferred-payment terms, but it is thought that this will increase now that the Council has agreed to the period of repayment being extended from three to ten years. The popularity of the hire-purchase scheme for electrical appliances continues, the revenue obtained from every type of apparatus showing considerable increase. The showrooms have been doubled in size and their value is demonstrated by the fact that 1,050 electrical appliances, representing a total of 1,230 kW, were sold during the year. Under an agreement with the Central Electricity Board a supply was given to Ormskirk on February 7th.

**Spalding.**—BULK SUPPLY.—The Urban District Council has accepted from the Peterborough Corporation revised terms for the supply of electricity in bulk, *viz.*, £5 per kVA of maximum demand, plus 0.4d. per kWh as from April 1st last for a period of two years.

**Stranraer.**—INAUGURATION OF SUPPLY.—The official inauguration of the electricity supply at Stranraer took place last Friday night when a dinner was given by the provost, magistrates and the Town Council. Provost Waddell, who performed the switching-on ceremony, explained the history of the scheme, and expressed the hope that it would lead to a new era in the prosperity of the town. Congratulations were conveyed from the neighbouring burghs of Wigtown and Newton-Stewart, and the toast of "Success to the Scheme" was proposed by ex-Provost Dyer, convener of the Electricity Committee. The scheme was carried out by the Wigtownshire Electricity Company, and was promoted by the Holderness Trust, Ltd.

**Stone.**—YEAR'S WORKING.—The accounts of the Urban District Council electricity undertaking for the year ended March 31st last show a net profit of £228, to which was added a balance brought forward of £328, making a total of £556. Sales of electricity amounted to 308,000 kWh, an increase of 125 per cent. on the previous year's figures.

PRICE REDUCTIONS.—The Council has approved the following reductions in charges for electricity:—Lighting: From 9d. to 8d. per kWh. Shop and hotel lighting: From 9d. to 8d. for the first 100 kWh during the winter quarters and for the first 25 kWh during the summer quarters. Lighting through prepayment meters: From 10d. to 9d. per kWh.

**Sunderland.**—DOMESTIC LIGHTING CONCESSIONS.—The Town Council has accepted a recommendation of the Electricity Committee to make small concessions in the domestic lighting rate in consequence of the re-assessment of properties affecting the standard charge of 15 per cent. on rateable values.

**Swanscombe.**—PROVISION OF FITTINGS.—At a recent meeting of the Urban District Council Housing Committee it was reported that the offer of the Kent Electric Power Co. to provide electrical fittings to Council houses (already wired) upon payment by the tenant of 2d. per kWh above the ordinary prepayment rate until 400 kWh are paid for, had been accepted.

**Swansea.**—MAINS EXTENSIONS.—The Corporation Electricity Committee has decided to carry out the following mains extensions: From the Cocket and Fycock sub-stations to the new mental hospital (£3,760); from Gellygrafog sub-station to a new sub-station to be erected at Tir John North (£2,108); from Fleet Street sub-station to a sub-station to be erected at the site of the new Civic Centre, Victoria Park (£1,435); and from Fisher Street to a new sub-station to be erected in Fisher Street (£1,006).

ASSISTED WIRING.—Application is to be made for sanction to a loan of £10,000 for the assisted wiring scheme.

**Swindon.**—METER RENTS.—The Corporation Electricity Committee has decided that after October 1st the charge for an electricity meter for lighting, heating, and power shall be 6s. per annum where the consumption registered on the meter in any one year is of less value than 16s.

**Truro.**—TIDAL POWER SCHEME.—At a recent meeting of the City Council the River Committee reported that Truro River had been suggested for the purpose of utilising tidal energy for the production of electrical energy. The system evolved by Tidal Energy, Ltd., consisted in shutting off estuaries from the sea by means of a dam, wall or embankment, thereby creating an artificial head of water for the purpose of driving turbines. The company proposed to erect a demonstration tidal power station. It had previously been proposed to erect the demonstration station on the River Gannel at Newquay, but the Board of Trade had refused to sanction the scheme owing to navigation difficulties. Tidal Energy, Ltd., now propose, as an alternative site, the Tresillian River, where a lock of sufficient size would be provided to deal with existing navigation up and down the river. The scheme was estimated to cost £20,000. Owing to the monopoly of electricity for the whole of Cornwall, it was not intended to sell energy to consumers. If the Tresillian River was used, a roadway could be constructed over the embankment adjoining the existing roads on both sides of the river. The Council decided to send a copy of the report to the company for its confirmation.

**Wareham (Dorset).**—PRICE REDUCTION.—The Bournemouth and Poole Electricity Supply Co., Ltd., has reduced the charge of electricity for lighting at Wareham from 1s. to 10d. per kWh.

**York.**—EXTENSIONS INAUGURATED.—The City Council has provided a supply of electricity to the rural parishes of Sutton-on-Forest, Stillington, and Huby, the supply being switched on by members of the Corporation on September 8th.

# Traction

**Birkenhead.**—YEAR'S WORKING.—The Corporation tramway undertaking recorded a net profit of £1,114 for the past year, as compared with £6,845 in 1929-30. The total revenue declined from £88,706 to £78,620.

**Continental.**—HUNGARY.—It is stated that the work of electrifying the railway between Buda Pesth and Komorn has been divided into five contracts which have been allocated to the A.E.G.-Union, Ganz & Co., Siemens-Schuckert, Brown-Boveri and Co., and the Kraftubertragungs Gesellschaft.

FRANCE.—A system of automatic traffic control is to be tried out experimentally at some of the most congested crossings in Paris.

**Luton.**—TRANSPORT OFFER.—The Town Council has received a letter from the Eastern National Omnibus Co., Ltd., stating that although it is not in a position to purchase the tramway undertaking, it is prepared to consider becoming the transport authority for the town on a basis satisfactory to the Council, the Minister of Transport, and itself.

**Manchester.**—THE PROPOSED UNDERGROUND RAILWAY.—Supporters of Manchester's £10,000,000 scheme for an underground railway are preparing to resist a possible attempt to have the enterprise shelved indefinitely in view of the national financial crisis. The *Daily Dispatch* understands that a meeting of the Underground Railways Committee—the first for many months—is to be called shortly to consider the future of the scheme. The railway companies have put forward tentative plans of co-operation with the City Council in the undertaking.

**Newport (Mon.).**—YEAR'S WORKING.—During the past financial year there was a decrease of 3,352,067 in the number of passengers carried on the tramways, the total number being 10,795,667. The car mileage declined from 1,220,966 to 1,019,060, while the receipts amounted to £68,956, a decrease of £21,290 as compared with the preceding year, due largely to the substitution of 'buses for trams.

# Telegraph and Telephone

**International Telephony.**—BELGIUM-GERMANY.—A long-distance telephone cable has been in operation between Brussels, Liège, and Hergenrath, on the German frontier, since 1926. As a result of the increased use of the line the Belgian Telegraph and Telephone authorities have lately placed a contract with the Siemens and Halske Co., of Berlin, for the erection of a second line between Liège and the German frontier. The German authorities have also placed a contract for a second line between the frontier and Aix-la-Chapelle.

**Italy.**—TELEPHONE CONSTRUCTION.—The Minister of Communications will shortly place contracts for new telephone construction and extensions to the value of 250,000,000 lire (£2,700,000). The work should be completed by 1934; the manufacture of cables will account for an outlay of 75,000,000 lire; amplifying and other plant, roughly, 40,000,000 lire, of which only the Pupin coils (value 10,000,000 lire) will be made in Italy; the construction of buildings, offices, and the placing of the main cable in position, 135,000,000 lire. Work will commence at once, and this winter about one-third of the operations in the provinces of Campagna, Puglie, and Basilicata (estimated cost 80,000,000 lire) will be greatly advanced. Several underground cables are also under consideration to connect Turin with the French national cable at Modane. At present a submarine cable is under construction between the mainland and Sardinia, and should be completed by January. For the maintenance of outside telephone plant a sum of 3,000,000 lire has been allotted.

All this will be State work, but telephone companies holding concessions will carry out other enterprises, for most of which contracts have already been placed. The Telefonica Tirrena Company, operating mainly in Liguria and Tuscany, will construct new plant costing 69,000,000 lire (cables, 35,000,000 lire; urban lines, 22,000,000; various works, 12,000,000). The Società Esercizi Telefonica Napoli, operating chiefly in southern Italy and Sicily, will build new urban and inter-urban lines costing 17,000,000 lire, and telephones and exchanges, apart from internal plant. The Società Telefonica Interregionale Piemontese e Lombardia plans special work in Piedmont and Lombardy to cost 6,5000,000 lire. The Telefonica delle Venezie proposes to spend 4,000,000 lire on special works, and the Telefonica Italia Medio Orientale has contracted for works valued at 3,500,000 lire.—*Reuter's Trade Service* (Rome).

**Malaya.**—CARRIER TELEPHONY.—The inauguration of the first link in the interconnection by telephone of Singapore with the rest of the Federated Malay States is announced by the Oriental Telephone and Electric Co., Ltd. The carrier telephone-telegraph system by means of which communication is being established is being installed by Standard Telephones and Cables, Ltd.

**Nigeria.**—COMMUNICATIONS.—The annual colonial report (No. 1,528, H.M. Stationery Office, price 1s. 6d. net) shows that during 1930 telegraph traffic increased slightly, facilities were provided at two additional post offices, and traffic was accelerated by the extension of quadruplex operation on main-line circuits.

The reconstruction of the Lagos-Oshogbo and Port Harcourt-Enugu main telegraph lines was completed; the railway signal line on the Ifo-Idogo branch, and a telephone traffic control circuit between Port Harcourt and Enugu were also completed. A telephone traffic control circuit between Apapa and Ibadan was under construction.

New telephone exchanges at Aba and Bukuru were opened, the former being in trunk-line communication with Port Harcourt and the latter with Jos. The Bukuru exchange affords telegraph facilities to a wide area of the tin mines field.

A wireless telegraph service between Badagry and Lagos was brought into public use, being the first wireless channel to be opened for commercial purposes in Nigeria, but the amount of traffic was disappointingly small; valuable experimental work was carried out during the year with a view to establishing wireless communication with the Cameroons under British mandate.

**North Africa.**—TELEGRAPH CABLE.—Work has been begun on the laying of a new submarine telegraph cable between Marseilles and Tunisia to supplement the existing cable, which was put into service in 1898.

**Photo-telegraphy.**—LONDON-ROME SERVICE.—The Postmaster-General announces that a service of picture telegraphy has been opened between London and Rome. Picture telegrams from other places in Great Britain will be sent by post to London, and similarly between Rome and other places in Italy.

**South Africa.**—RAILWAY TELEPHONY.—The most recent addition to the South African Government Railway telephone facilities, says the general managers' "Bulletin," is the Johannesburg-Cape Town circuit connecting headquarters with the system manager's office at Cape Town. It includes switching points and exchanges at Johannesburg, Klerksdorp, Kimberley, De Aar, Beaufort West, Touws River, and Cape Town, in addition to repeaters at Klerksdorp, De Aar, and Beaufort West. Repeaters have also been installed at Ladysmith and Bloemfontein, by means of which existing comparatively short-distance telephone facilities are now being utilised to enable conversations to be arranged for distances of 1,000 miles and more.

# Radio

**France.**—NEW STATIONS.—A project for the erection of eleven new Government stations has been alluded to in a speech by M. Guernier, Minister of Posts and Telegraphs. These stations will be in addition to the two long-distance stations, the right to which France obtained at the Prague conference. The scheme forms part of a serious effort to put on its feet the French wireless industry, which is admitted to be in a bad way, largely owing to the prolonged quarrel between the advocates of government monopoly and of private initiative. The French Post Office is in possession of credits amounting to 80 million francs (£600,000) provided by M. Tardieu's scheme with which to make the contemplated improvements.

**International Relays.**—U.S.A.-EUROPE.—It is announced that the Columbia organisation has completed arrangements for a regular interchange of programmes between the U.S.A. and five European countries, namely, England, France, Austria, Hungary, and Czecho-Slovakia, which will begin this autumn on a reciprocal basis. In addition, one-way German-American relays have been arranged for.

**Russia.**—NEW SOVIET STATION.—The large new broadcasting station at Novosibirsk, which is intended for long-distance reception by crystal sets, will be opened in October. According to the Soviet press, its many new features will enable listeners in India and Persia to "hear the voice of Moscow."—*Reuter.*

**Radio Exchange.**—NOTTINGHAM.—The City Council has sanctioned the inauguration of a broadcast relay, or re-diffusion, service at the rate of 1s. 6d. per week per subscriber, listeners needing to install loud-speakers only.

**Television.**—B.B.C. EXPERIMENT.—Instead of the midnight television broadcasts hitherto made on two nights a week from the Baird studios at Long Acre, a weekly half-hour broadcast is to be made at 10.30 p.m. from the B.B.C.'s studio near Waterloo Bridge. Experiments are also to begin with a view to television broadcasts from the northern regional and national stations.

**Yugo-Slavia.**—NEW STATION.—The powerful new sub-station at Skoplje, in the south-east, towards Macedonia and Bulgaria, is very nearly completed, and will begin transmitting about the end of this month, says *World-Radio*. It has cost nearly £100,000, and will work with 20 kW on a wavelength of 2,300 m.

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### Regulations for Asbestos Factories and Workshops

Draft regulations have been drawn up by the Home Office for the protection of workers employed in certain processes involving exposure to asbestos dust. These regulations follow generally the provisions recommended by the Factory Department in its report, following upon an inquiry held last year, and the recommendations of a committee of manufacturers and H.M. Inspectors of Factories, which was set up to consider methods for the suppression of dust in this industry.

# Contract Information

*When "Contracts Open" are advertised in our "Official Notice" pages the date of the "Electrical Review" containing the advertisement is given in parentheses below*

## Contracts Open

**Australia.**—VICTORIAN ELECTRICITY COMMISSION.—November 16th. Aluminium steel cored cable. (September 4th.)

October 20th. Postmaster-General's Department. Supply and delivery of testing instruments. Specifications, &c., from the High Commissioner, Australia House, London. Tenders.

October 27th. Loading coil pots. Specifications, &c., from the High Commissioner, Australia House, London. Tenders.

**Beverley.**—September 26th. East Riding and York Joint Board for Mentally Defectives. Electrical installation at Brandesburton Hall. (September 4th.)

**Coventry.**—September 21st. Housing Committee. Installation of electric lighting in 470 houses on Hen Lane housing estate. Specification and form of tender from Mr. A. F. Underhill, housing director, Council House.

**Derby.**—October 5th. Tramway and Omnibus Department. Supply and erection of approximately 3½ miles of trolley-omnibus overhead lines. (September 11th.)

**Devon.**—September 25th. Mental Hospital Committee. Six months' supply of electric lamps, &c. Particulars from the clerk of the Institution, Exminster.

**Dumbarton.**—County Council. Three electrically driven centrifugal pumps and one oil-engine driven pump for Leven main-drainage scheme. Particulars from Mr. D. T. H. MacLennan. county engineer, 24, George Square, Glasgow.

**Egypt** (CAIRO).—October 8th. Prison Administration. Diesel engine driven generator for Abu Zaabal power station. (A.X. 11055.)*

October 28th. Department of Public Health. Electro-medical and X-ray apparatus for six months commencing November next. (A.X. 11069.)*

December 2nd. Ministry of the Interior. Complete power station for the town of Tantah. (A.X. 11066.)*

**Glasgow.**—September 24th. Education Department. Electric lighting installation at North Carntyne School, Liberton Street, E.1. Specifications (deposit £1 1s.) from the Property Department, Education Offices, 129, Bath Street.

**Great Western Railway.**—October 1st. Telegraph instruments, electrical apparatus, &c. (See this issue.)

**Hull.**—September 24th. Corporation. Electric lighting installations and fittings for schools at Ainthorpe Grove and Endyke Lane estate. Particulars (deposit £1 1s.) from Mr. D. Harvey, city architect, Hanover Square, Hull.

September 21st. Education Committee. Installation of electric lighting at Estcourt Street School and Children's Home, Hessle. Specifications, &c., from Mr. R. C. Moore, director of education, Guildhall.

**Keighley.**—September 28th. West Riding Public Assistance Committee. Installation of an electric bed lift at the County Hospital. Specification and form of tender from Mr. P. O. Platts, West Riding architect, County Hall, Wakefield.

**London.**—CENTRAL ELECTRICITY BOARD.—September 21st. Construction of site works, foundation works, &c., at Agecroft, Clarence Dock, Crewe, St. Helen's, Blackburn, and Nelson. (August 14th.)

September 21st. Construction of site works, foundation works, &c., at Oxford, Gloucester, Bourne Valley, Swindon, Newport, and Plymouth. (August 21st.)

LONDON COUNTY COUNCIL.—September 21st. Wiring and fittings at St. James's Hospital, Balham (August 28th.)

FULHAM.—September 23rd. Borough Council. Wiring for lighting, heating, and cooking at Swan housing scheme. (September 4th.)

SOUTHWARK.—October 21st. Borough Council. Cable. (September 11th.)

**Morley.**—September 25th. Corporation Property Committee. Wiring of 150 houses, Victoria housing estate. Specification (deposit £2 2s.) from Mr. F. Turner, borough engineer, Town Hall.

**New Zealand.**—WELLINGTON.—November 19th. New Zealand Railways. Intercall telephone system between Christchurch and Invercargill. (A. 11060.)*

Public Works Department. November 17th. Four 3,333-kVA oil-immersed self-cooled transformers. (A.X. 11079.)*

December 15th. 270 galvanised steel transmission line towers, complete with arms, ground stubs, and accessories. (G.X. 10703.)*

INVERCARGILL.—October 28th. City Council. Centrifugal low-lift pumping plant, including motor and control gear. (G.X. 10738.)*

**Rosslynlee.**—September 26th. Midlothian and Peebles Asylum. Six months' supply of various articles, including electrical fittings. Forms of tender from Mr. Chilton L. Addison-Smith, clerk and treasurer, 19, Heriot Row, Edinburgh.

**South Africa.**—CAPE TOWN.—October 14th. Electricity Department. Street-lighting fittings. (G.X. 10733.)*

**Warrington.**—September 21st. Electricity Department. Twelve months' supply of cables, earthenware conduits, concrete slabs and tiles. (September 4th.)

**Wolverhampton.**—October 13th. Corporation. Four sets of sludge pumps of the treble-ram, two-barrel, double-acting type driven by electric motors. Also one electrically driven centrifugal pump. Specifications and form of tender (deposit £2) from Messrs. Dodd & Watson, Wellington House, Bennetts Hill, Birmingham.

* Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.1.

## Contracts Closed

**Dartford.**—Urban District Council. Accepted :—
Wiring 105 houses for electric lighting (£515).—Bexley Heath Electrical Co.

**Denny and Dunipace (Stirlingshire).**—Town Council. Accepted :—
Electrical work at 24 houses.—A. Robertson.

**Dunfermline.**—Corporation. Accepted :—
Electrical work at housing scheme.—Rolland & Co.

**Lamp Contracts.**—The Southern Railway has placed a contract with the General Electric Co., Ltd., for metal filament gas-filled and vacuum lamps, pearl and clear finish, and also for Robertson carbon filament lamps for twelve months from September 1st, 1931. The company has also received an order from the General Post Office for a supply of lamps of similar types. commencing September 1st.

**London** (SHOREDITCH).—Electricity Committee. Recommended :—
Electrical switchgear in connection with the bulk supply of electricity to the London and North-Eastern Railway (£2,920).—General Electric Co., Ltd.

**Manchester.**—Paving Committee. Accepted :—
Four-way traffic beacon.—Forest City Electrical Co., Ltd.

**Newcastle-upon-Tyne.**—Newcastle-upon-Tyne Electric Supply Co., Ltd. Accepted :—
Three turbines for Bankfoot power station.—Richardsons, Westgarth & Co., Ltd.

**Peterborough.**—City Council. Accepted :—
Installation of electric lighting in houses on the Park Lane estate (£257).—A. E. Sharpe.

**Southampton.**—Southern Railway Co. Accepted :—
Water-control equipment, including twenty-nine electrically operated sluice valves for the new graving dock.—Glenfield & Kennedy, Ltd.

**Swansea.**—Education Committee. Accepted :—
Electric lighting at Waunarlwydd school (£98).—Cole & Day.

## Forthcoming Events

**International Illumination Congress.**—September 13th-18th, Cambridge. September 19th, London.

September 1st—September 25th. 9 p.m. to midnight each day. Illumination of principal London buildings.

**Faraday Society.**—Friday, September 18th. Rooms of the Chemical Society, W. 5.30 p.m. "The Passivity of Metals," by Prof. W. J. Müller.

**National Radio Exhibition.**—September 18th-26th. Olympia.

**Royal Institution.**—September 19th-25th. London. Faraday celebrations.

**Association of Supervising Electrical Engineers.**—Saturday, September 19th. Visit to Shipping, Engineering and Machinery Exhibition, Olympia. September 26th-27th. National conference, &c., with official visit to the Faraday Electrical Exhibition, Royal Albert Hall, London.

**South Midland Centre.**—Monday, September 21st, Midland Institute, Paradise Street, Birmingham, 7.45 p.m., Michael Faraday Centenary. Public commemorative meeting. Address by Mr. F. Forrest.

**Institution of Electrical Engineers.**—September 22nd-25th. Kingsway Hall, W.C. Summer meeting and Faraday celebrations. Royal Albert Hall. Conversazione and Faraday Exhibition.

**Electroplaters' & Depositors' Technical Society.**—Friday, September 23rd, Rehearsal Room, Albert Hall, London. Faraday Centenary Celebrations, 3.30 p.m. "The Rise and Early Development of Electroplating," by Dr. R. S. Hutton, 7.30 p.m. "Electrodeposition and the Engineer," by D. J. Macnaughtan.

**Institution of Mining Engineers.**—September 23rd-25th. Manchester. Summer meeting.

**Electrical Association for Women.**—Wednesday, September 23rd. 8.30 p.m. Motor coach tour of London flood-lighted buildings. Saturday, September 26th. Visit to Shipping, Engineering and Machinery Exhibition, Olympia. Monday, September 28th. 3.30 p.m. Visit to Faraday Exhibition.

**British Association.**—September 23rd-30th. Centenary meeting. September 23rd. Albert Hall, 3 p.m. Inaugural meeting. Central Hall, Westminster, 9 p.m. Presidential address by Gen. the Rt. Hon. J. C. Smuts

**Royal Society.**—Thursday, September 24th. Burlington House, Piccadilly, W. 8.30 p.m. Soirée.

**Women's Engineering Society.**—September 25th-28th. Crosby Hall, Cheyne Walk, S.W. Annual conference.

**Electric Lodge No. 2087.**—Saturday, September 26th. Café Royal, Regent Street, W. Address on the Life of Faraday by W. Bro. Michael Faraday.

**Electrical Power Engineers' Association.**—September 26th, Holborn Restaurant, W.C. Annual dinner.

**Iron and Steel Institute.**—September 29th—October 1st. Swansea. Autumn meeting.

## Our Service Department

Inquiries must be accompanied by a stamped addressed envelope.

We shall be glad to learn the name and address of the makers of the following :—

JIFFY water heater.

# Notes

## The British Association

One of the bodies which is taking a leading part in next week's Faraday celebrations is the British Association for the Advancement of Science. The Association is holding its centenary meeting and can regard with pride and satisfaction a hundred years of activity which has fully justified its title. In these days, when scientific societies are legion, the British Association's prominence in the scientific world does not appear to be so great as it used to be. The fact remains, however, that its annual meetings still constitute a Parliament of Science, providing a means of bringing together the savants of all countries for the interchange of experience and ideas. A notable feature of the meetings of recent years has been the endeavour to relate science (in a widely interpreted form) to the needs of modern life and industry. In this work the Economics Section, in particular, has proved very successful, and it has been the dominant influence in the Industrial Co-ordination Committee which was formed at last year's Bristol meeting. In connection with the centenary meeting, this Committee, which represents economic, engineering, educational, physiological, and psychological interests, has produced a programme giving particulars of the sessions which are being devoted to current applications of the sciences to business. This forms a useful guide for those who are concerned mainly with the severely practical side of science.

## Educational

CHELSEA POLYTECHNIC, Manresa Road, London, S.W.3.—A course of six lectures on accumulators will be given by Mr. R. W. Minter on Wednesdays at 7.30 p.m., commencing on October 7th, 1931. The lectures are intended to provide a course of instruction for those engaged in the manufacture, repair, and sale of accumulators, and they will also be of value to persons responsible for their maintenance and use. Demonstrations of various types and samples will be given; both lead-acid and alkaline cells will be described. The fee for the course is 5s.

HACKNEY TECHNICAL INSTITUTE, Dalston Lane, E.8.—Classes in all branches of electrical engineering re-open on September 28th. Full particulars may be obtained on application at the Institute.

THE BOROUGH POLYTECHNIC, Borough Road, London, S.E.1.—Technical classes in synthetic resins, moulding materials, and plastics will commence on September 28th, enrolment taking place on the preceding Monday, Wednesday, and Friday evenings. Full particulars may be obtained from the Principal.

COLLEGE OF TECHNOLOGY, MANCHESTER.—The prospectus of the courses for the 1931-32 session is now available. Copies may be obtained on application to the Principal.

## Appointments Vacant

Public lighting superintendent for Manchester Corporation.
Distribution engineer for Mirfield Urban District Council.
Meter tester for Winchester Electricity Department.
Superintendent of telephones for the Government of St. Vincent.
(See our advertisement pages to-day.)

## Notes on Marine Cable Work

A handy publication has just been issued by Messrs. Johnson & Phillips, Ltd., relating to the employment of electric cables in ships. Commencing with a brief account of the development of rubber-insulated cables, the book proceeds to deal similarly with varnished-cambric and paper-insulated types. The advantages and drawbacks of each type are stated, and the questions of metallic sheathing, armouring, etc., are treated. Special types of cables are then briefly covered; then the question of the selection of appropriate cables is discussed, and representative specifications are given. In another chapter the necessity of using care in the handling of cables prior to and during the installation is stressed, and the correct methods are plainly set out. Next comes a short dissertation upon current-carrying capacities, with a number of useful tables. Regulations governing the electrical equipment of ships are quoted at length, reference being made to American requirements. An appendix gives full-load currents and speeds of motors.

## Electrical Association for Women

Miss Eva Moss, secretary of the Bradford branch of the Association, has issued the programme for the coming winter session, which opened on September 15th with a lantern lecture by Colonel A. P. Pyne on "How Electric Cables Are Made."

## Generation of Electricity, August, 1931

The official returns rendered to the Electricity Commissioners show that 758 million kWh was generated by authorised undertakers in Great Britain during the month of August, 1931, as compared with the finally revised figure of 721 million kWh in the corresponding month of 1930, or an increase of 5.1 per cent.

During the first eight months of 1931 up to the end of August the total amount of electricity generated by authorised undertakers was 7,173 million kWh, as compared with the finally revised figure of 6,928 million kWh for the corresponding period of 1930, representing an increase of 3.5 per cent.

## Diesel Engine Users' Association

The 1931-32 session of the Diesel Engine Users' Association opens on October 7th, when a joint meeting with the Institute of Fuel and other societies will be held at the Institution of Electrical Engineers, Victoria Embankment, W.C. The chair will be taken by the President of the Institute, Sir David Milne-Watson, and Dr. W. R. Ormandy will read a paper on "Coal: Smokeless Fuel and Oil from the National Standpoint." Other papers to be read during the session are: November 5th, "The Elimination of Vibration," by Mr. R. B. Grey; November 24th, "Diesel Engines for Overseas Work," by Mr. H. V. Stead; December 10th, "Heavy Oil Engines for Water Pumping Plant," by Mr. C. W. Casse; March 1st, "Diesel Engines for Road Transport," by Mr. C. B. Dicksee.

## Floodlighting St. Paul's

In our report of the London proceedings of the International Illuminating Congress, the exterior lighting of St. Paul's Cathedral was attributed to the 26th (London) A.A. Battalion R.E. (T.A.), which also lighted two city churches. We understand, however, from Major H. Leigh, R.E. (T.), acting-adjutant of the 27th Battalion, that the floodlighting of St. Paul's was solely in the care of volunteers from his anti-aircraft unit.

## Electrification in Madras

Electricity is making very rapid strides in several important towns in the Madras Presidency and the electrification of the towns of Salem and Erode, begun in the middle of last year, is, *Indian Engineering* states, nearing completion. Power generated at Sivasamudram in Mysore State is to be transmitted over a distance of about 100 miles and supplied to these towns in British India.

Erode forms part of the proposed Pykara transmission system, but at present the method of electrifying Salem has not been definitely decided upon. The combined demand of the Erode and Salem districts is expected to exceed 500 kW after three years of operation, rising to nearly 1,500 kW in ten years. The electric power requirements of the two towns could thus be supplied from the Mettur sub-station for at least three years. The present idea of the Government of Madras is that after the third year Erode would be supplied from the Pykara system, while Mettur could continue to supply Salem until such time as power is generated at the Mettur Reservoir, or it might also be included in the Pykara system, which is expected to function at the end of next year.

The scheme contemplates taking three-phase power at 50 cycles up to a maximum of 500 kW from the main 3,300-volt busbars at the Mettur receiving station. This power would be transformed up to 22,000 volts and transmitted to Erode and Salem, some 32 and 36 miles away. As considerable voltage variation is expected at Mettur, it is proposed to install an induction regulator in the circuit. Power at line voltage will be sold in bulk to both municipalities, or to a distribution syndicate and to any other potential consumer near the lines.

## A New Swiss High-pressure Testing Laboratory

A new high-pressure testing laboratory has recently been completed and put in operation at the works of the Brown-Boveri Co., at Baden, Switzerland. The building, which measures 137ft. in length by 75ft. in width, houses a 12-pole short-circuit generator for a closing and opening capacity of 800,000 and 500,000 VA, respectively, a 2,200-kW driving motor with liquid starter, and a 85,000-kVA transformer which is intended to be connected between the generator and the oil-circuit breaker to be tested when a higher pressure than 11,000 V is required. The actual test beds for the breakers are situated in the open air adjacent to the building.

## Mining Locomotives

Messrs. Greenwood and Batley, Ltd., have produced an all-battery locomotive possessing possibilities for underground haulage. The first models are for certain Scottish mines where naked-light conditions obtain, but only minor alterations will have to be made to reach the necessary standard which will permit the use of the locomotive in more gassy mines.

The outstanding features of the locomotive are its small height (three feet) and its great drawing power. Driven by two 8-h.p. motors, it will draw on the level a load of 30 tons, using tubs with plain bearings; or a load of 60 tons in tubs having roller bearings. The locomotive, which is fitted throughout with ball and roller bearings, is 38 in. wide with a 24-in. gauge, weighs about 3¼ tons, has an overall length of 115 in., and can take a 30-ft. radius curve. It is fitted with flameproof motors and controller of approved type for mines. Power is obtained from a "Kathanode" battery of 390-Ah capacity; sanding gear to all four wheels is supplied, and powerful hand brakes.

## An Ampère Museum in France

A year or so ago the house at Poleymieux, in the Rhône Department of France, in which Ampère was born, was acquired as a permanent memorial to the scientist and inventor by the French Société Française des Electriciens. Thanks to the efforts of the body known as the Société des Amis d'Ampère, a museum in which many of his early experimental machines and apparatus have been collected has recently been inaugurated in the house.

# Our Personal Column

**Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements**

**Mr. P. J. Robinson,** City Engineer of Liverpool, will represent the Incorporated Municipal Electrical Association at the annual conference of the National Smoke Abatement Society which is to be held at Liverpool from September 18th to September 20th.

**Mr. Robert Blackmore,** M.I.E.E., of the Central Electricity Board, will initiate a discussion on the progress of the electrical grid at this conference.

**Mr. James Sadler,** for over 31 years engaged in the Electricity Department at Great Yarmouth, who is retiring, has been presented with a saddlebag armchair. **Miss D. M. Hawkins,** who is leaving to become demonstrator and showroom assistant at the Cheltenham Electricity undertaking, has been given a cut-glass trinket set.

**Mr. James M. Skinner,** president of the Philadelphia Storage Battery Co. of America, is chairman of the Philco Radio and Television Corporation of Great Britain, Ltd., the registration of which was announced in our last issue. We are informed that **Mr. Carleton Dyer,** the managing director, who is a Canadian, will be in active control of the new venture. There are two other American directors and two or more British are to be appointed.

**Sir Frederick Lewis, Bart.,** has been appointed chairman of British Auxiliaries, Ltd. (the reconstituted company of Fiat British Auxiliaries, Ltd.). **Mr. J. Rogers,** former works manager of the old company, has been appointed general manager of the reconstituted company.

**Major G. A. B. Leishman,** M.C., A.M.I.E.E., has been appointed assistant Electrical Engineer (Traction), and Engineer for the Southern Electrified Lines, London, of the London Midland and Scottish Railway. According to the *Electric Railway, Bus and Tram Journal,* he was educated at Marlborough, afterwards receiving training at Faraday House. He then obtained practical experience with Bruce, Peebles & Co., Ltd., and with the General Electric Co. Inc., of Schenectady, U.S.A., with which firm he remained as tester until the outbreak of war. In 1920 he joined the former London and North Western Railway as junior assistant in the office of the Chief Electrical Engineer at Euston, and in 1928 was appointed assistant to Electrical Engineer (Traction), London Midland and Scottish Railway.

**M. B. Barthelemy,** the leading French authority on television, has recently been appointed a Chevalier of the French Legion of Honour.

**Mr. J. H. D. Bryan,** electrical engineer with the London Power Co. at St. John's Wood power station, who was married recently to Miss M. P. Jackson, was presented by his colleagues with a clock, a barometer in case, and a cigarette box.

**Professor J. C. McLennan** is retiring from the post of head of the Department of Physics at Toronto University and is to take up his residence in England.

**Mr. H. W. Bosworth,** joint managing director of the Lancashire Dynamo and Motor Co., Ltd., is leaving England on September 26th for an extended business tour of South Africa. He will visit all the large centres of the Dominion in connection with the marketing of the products of the Lancashire and Crypto Companies.

## Obituary

**Mr. A. J. Moss.**—The death occurred recently of Mr. A. J. Moss, who had for over 32 years been on the staff of the Ashton-under-Lyne Corporation Electricity Department. He was foreman of the Outdoor Department, and was responsible for the laying of cables and services in the borough.

**Mr. J. C. Murray.**—The death is reported at the age of 65 of Mr. James C. Murray, mains foreman of the Aberdeen Corporation Electricity Department. Mr. Murray had been associated with the department almost since its inception in 1893, and was one of the original staff.

# Financial Section

**New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies, Dividend Changes, Transactions in Stocks and Shares**

## New Companies Registered

**Slektun Products, Ltd.**—Private company. Registered September 7th. Capital £100 in £1 shares. Objects: To carry on the business of electricians, electrical and mechanical engineers, etc. The directors are: A. J. Hunt, 8, Trumans Road, Stoke Newington, N.16, and R. A. W. Longhurst, 13, Beaumont Mews, Marylebone, W.1. Registered office: 21, Douglas Street, Vauxhall Bridge Road, S.W.1.

**Hume Atkins & Co., Ltd.**—Private company. Registered September 5th. Capital, £1,000 in £1 shares. Objects: To carry on the business of electricians, lighting and mechanical engineers, manufacturers and suppliers of electrical fixtures, etc. The subscribers are: C. H. Hume, 16, Field Lane, Letchworth, and C. A. Atkins, 31, St. Saviours Road, Croydon. C. H. Hume signs documents as director. Registered office: Pixmore Avenue, Letchworth.

**Horace Boot & Partners, Ltd.**—Private company. Registered September 5th. Capital, £26,000 in 25,000 10 per cent. non-cumulative participating preference shares of £1, and 20,000 ordinary shares of 1s. each. Objects: To acquire all or any of the undertaking and assets and liabilities of the business carried on by H. Boot as "Horace Boot & Partners," at 7, Victoria Street, S.W.1, and elsewhere, and to carry on the business of consulting and advisory and supervising engineers, designers, draughtsmen, civil, electrical, mechanical, hydraulic and general engineers, etc. The subscribers are: H. Booth, 7, Victoria Street, S.W.1, and J. H. Bennett, 78, Rectory Road, S.W.6. The first directors are: H. Boot (permanent) and others to be elected by subscribers. Registered office: 7, Victoria Street, S.W.1.

**British Clarion Co., Ltd.**—Private company. Registered September 5th. Capital, £2,000 in 1,500 10 per cent. cumulative preference shares of £1, and 10,000 ordinary shares of 1s. each. Objects: To carry on the business of manufacturers of wireless instruments, gramophones and musical instruments, electrical engineers, etc. The directors are: Mark Bolsom, 67, Bridge Lane, N.W.1; Morris Bolsom, 2, Kidderpore Avenue, Hampstead, N.W.; and W. H. Smedley, 35, York Road, Woking. The first two named are life directors.

**Beamlites, Ltd.**—Private company. Registered September 10th. Capital £5,000 in £1 shares. Objects: To acquire any invention relating to the production, treatment, storage, application, distribution, and use of anti-dazzle devices for automobile head-lamps and any apparatus therefor, and to carry on the business of manufacturers of and dealers in motor cars, cycles, &c. The directors are: Mary E. Cresswell, 20, Viewfield Road, Wandsworth, S.W.18 (director, Cresswells, Ltd.); S. Cresswell, 20, Viewfield Road, Wandsworth, S.W.18; A. Spurrier, 407, Upper Richmond Road, Putney, S.W.15 (director, Leyland Motors, Ltd.); and S. W. B. Stephen, "Woodlands," Hagley Road West, Birmingham. Secretary: G. F. Underwood. Registered office: Concord House, 61, High Street, Wandsworth, S.W.18.

**Steline, Ltd.**—Private company. Registered September 10th. Capital £1,000 in £1 shares. Objects: To carry on the business of manufacturers of, agents for, and dealers in magnetos, ignition appliances, dynamos, sparking plugs, electrical and mechanical horns, lamps, switchboards, etc. The subscribers are H. G. Hancock, 154, Upminster Road, Rainham, Essex; and W. Price, 50, Pall Mall, S.W. The directors are: F. T. Bersey (permanent governing director), E. A. Hardy and S. C. Newson. Solicitors: John B. Purchase & Clark, 50, Pall Mall, S.W.1.

**Pamphonic Reproducers, Ltd.**—Private company. Registered September 11th. Capital £300 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in electrical and mechanical apparatus for the reproduction of sounds of all kinds, records, electrical goods, instruments for musical entertainment, &c. The first directors are: P. H. Taylor, 36, Albert Road, Regent's Park, N.W.; and E. Lavington, 26, Holmewood Gardens, Streatham. Solicitors: Kimbers, Williams & Company, 79, Lombard Street, E.C.3.

**F. B. J. Radio Products, Ltd.**—Private company. Registered September 11th. Capital £500 in £1 shares. Objects: To manufacture and sell radio receiving apparatus and accessories, &c. The directors are F. B. Jackman, 71, Birchfield Road, Handsworth, Birmingham; and L. Nicholls, 220, Holly Lane, Erdington, Birmingham. Secretary: L. Nicholls. Registered office: 71, Birchfield Road, Handsworth, Birmingham.

## Returns of Electrical Companies

**Macintosh Cable Co., Ltd.**—Satisfaction to the extent of £50,000 on August 15th of first mortgage debenture stock authorised August 27, 1930, and registered October 20th, 1930, securing £350,000.

**Hestavox, Ltd.**—Capital, £5,000 in £1 shares. Return dated January 10th (filed May 7th, 1931). 3,004 shares taken up. £4 paid. £3,000 considered as paid. Mortgages and charges, nil.

**Callington & District Electric Supply Co., Ltd.**—Capital, £8,000 in £1 shares. Return dated March 27th, 1931. 7,430 shares taken up. £7,430 paid. Mortgages and charges, nil.

**County of Durham Electrical Power Distribution Co., Ltd.**—Capital £535,000 in £1 shares. Return dated April 1st, 1931. All shares taken up. £535,000 paid. Mortgages and charges, nil.

**Wadebridge & District Electric Supply Co., Ltd.**—Capital, £3,450 in 1,250 6 per cent. preference and 2,200 ordinary shares of £1. Return dated April 13th, 1931. All shares taken up. £460 paid on 360 preference and 100 ordinary shares. £2,990 considered as paid on the remainder. Mortgages and charges, nil.

**E.G.S. Co., Ltd.**—Mortgage dated August 31st, 1931, to secure £25,000 and any further advances, charged on properties in Newcastle-upon-Tyne and Leeds. Holders: Newcastle-upon-Tyne Permanent Building Society.

**North Wales Power Co., Ltd.**—Charge as additional security dated August 28th, 1931 (supplemental to trust deed dated May 12th, 1924, securing £1,700,000 4½ per cent. guaranteed debenture stock, and trust deed dated March 30th, 1928, securing £300,000 5 per cent. guaranteed second debenture stock). Property charged: Freehold lands and premises in Trawsfynydd and Maentwrog, Merioneth. Trustees for the 4½ per cent. guaranteed debenture stock, Whitehall Trust, Ltd.; for the 5 per cent. guaranteed second debenture stock, Prudential Assurance Company, Ltd.

**Mickelwright, Ltd.**—Satisfaction to the extent of £500 on May 14th, 1931, of debentures authorised December 7th, 1926, and registered December 9th, 1926. (According to the register of mortgages, the debentures registered December 9th, 1926, originally secured £1,500.)

**Celestion, Ltd.**—Satisfaction to the extent of £5,250 on August 31st, 1931, of debenture dated July 14th, 1931, and registered July 15th, 1931. Debenture dated August 31st, 1931, to secure £5,000 and a bonus of £500, charged on the company's undertaking and property, present and future, including uncalled capital. Holder: C. A. Maddin, Lloyds Bank Chambers, Surbiton.

**Rolls-Caydon, Ltd.**—Particulars filed on September 3rd of £6,000 first and £4,000 second mortgage debentures authorised July 21st, 1931, charged on the company's undertaking and property, present and future, including uncalled capital, the amounts of the present issue being £2,000 and £4,000 respectively.

**Industrial & Domestic Heaters, Ltd.**—Issue on August 31st, 1931, of £500 debentures, part of a series already registered.

**Moldrite, Ltd.** (renamed Moldcroft, Ltd., August 22nd, 1931).—Debenture, dated July 15th, 1931, to secure £200, charged on the company's assets, present and future, including uncalled capital. Holder: S. Prentice, 124, Clock House Road, Beckenham.

**Weldrics (1922), Ltd.**—Capital £25,000 in £1 shares. Return dated March 25th, 1931. 16,000 shares taken up. £13,925 paid. £2,000 considered as paid. £75 remains in arrears. Mortgages and charges, nil.

**Welding Appliances, Ltd.**—Capital £1,000 in £1 shares. Return dated April 1st, 1931. All shares taken up. £1,000 considered as paid. Mortgages and charges, nil.

**Kelvinator, Ltd.**—Capital £65,000 in 40,000 preference shares of £1 each and 500,000 ordinary shares of 1s. each. Return dated February 26th, 1931 (filed August 20th). All shares taken up. £65,000 paid. Mortgages and charges, nil.

**Reading Electric Supply Co., Ltd.**—Capital £200,000 in £1 shares. Return dated April 30th, 1931. All shares taken up. £195,650 paid. £4,350 considered as paid. Mortgages and charges, £146,984.

**Gamble & Sons, Ltd.**—Capital £4,000 in £1 shares. Return dated March 26th (filed May 21st), 1931. 350 shares taken up. £350 paid. Mortgages and charges, nil.

**Sherborne Electric Supply Co., Ltd.**—Capital £15,000 in £1 shares. Return dated May 4th, 1931. All shares taken up. £15,000 paid. Mortgages and charges, nil.

**Laurence, Scott & Electromotors, Ltd.**—Capital £310,995 in £1 shares. Return dated April 30th, 1931. 281,530 shares taken up. £131,775 paid. £149,755 considered as paid. Mortgages and charges, nil.

**Electric Conductors & Colours, Ltd.**—Capital £3,000 in £1 shares. Return dated December 31st, 1930 (filed June 2nd, 1931). 2,002 shares taken up. £627 paid (being 12s. 6d. per share on 1,000 and £1 per share on 2). £1,000 considered as paid on 1,000 shares. Mortgages and charges, nil.

**Sidebottom & Green, Ltd.**—A. J. D. Evans, of 29, Corporation Street, Manchester, ceased to act as receiver and manager on September 5th.

# City Notes

**Davis & Timmins, Ltd.,** have issued an interim report in which the directors state that the half-yearly accounts of the company and its subsidiaries to June 30th last show approximately that during this period they have just avoided making a loss. This adverse result, compared with previous years, is mainly attributed to bad trade. In addition, substantial provision has been made for the further writing-down of stock owing to the continued fall in the price of metal and also for other abnormal items. The directors have agreed to accept reduced fees and the salaried staff has accepted a 10 per cent. cut.

**The Oxford Electric Co., Ltd.,** announces that, as the purchase of that part of its undertaking within the 1890 Order by Oxford Corporation has not yet been completed, no interim dividend on the ordinary shares will be paid this year. No interim was paid last year, but there was a final distribution of 7 per cent.

**The Sun Electrical Co., Ltd.,** reports a net profit of £18,504 for the year ended April 30th last, to which is added £9,626 brought forward, making £28,130 available. It is proposed to pay a dividend of 7½ per cent. on the ordinary shares (5 per cent. already paid), and, after deducting directors' fees, &c., and placing £5,000 to reserve, to carry forward £7,828. Meeting: September 25th.

**Parker, Winder & Achurch, Ltd.,** announce that, in view of the disturbed state of trade and the uncertain outlook, it would be inadvisable to declare an interim dividend on the ordinary shares. An interim dividend is being paid on the preference shares.

**The International Automatic Telephone Co., Ltd.,** has declared an interim ordinary dividend of 3¾ per cent. (Same.)

**The Automatic Telephone Manufacturing Co., Ltd.,** has announced an interim dividend of 9d. per share on the ordinary shares.

**Western New South Wales Electric Power Pty., Ltd.,** has published a notice outlining its objects. The company was formed in 1930 with a nominal capital of £750,000 in £1 ordinary shares. In January last the issue of £700,000 8 per cent. first mortgage debentures was authorised, and the whole issue has been subscribed at par and is outstanding. The debentures carry interest at the rate of 8 per cent. per annum. The principal object of the company is the establishment at Broken Hill, N.S.W., of a central power station for the supply of power and compressed air to mines and other consumers at Broken Hill, but primarily to the mines and works of North Broken Hill, Ltd., Broken Hill South, Ltd., and the Zinc Corporation, Ltd.

**The Power Corporation of Canada** reports gross earnings of $3,412,404 for the year ended June 30th last, as compared with $3,702,912 in the preceding year. Included in the gross figure is $757,717 profit from sales of securities. During the year changes in securities held resulted in a loss of $900,548, which was charged to investment reserve. The net earnings were $2,924,693. Earnings were equivalent to $3.54 per share on the common stock, as against $4.21 in 1929-30. After deducting interest charges, &c., the balance carried forward was $3,531,162.

**The Shawinigan Water and Power Co.** has declared a dividend of 50 cents per share (against 62½ cents) on the common shares for the quarter ending September 30th. The directors state that the dividend has been reduced in order to avoid any undue reductions of the company's reserves. The reduced dividend will effect a direct saving in disbursements of $500,000 in the current year's accounts.

**British Insulated Cables, Ltd.,** has announced an interim dividend of 5 per cent. (1s. per share) on the ordinary shares, less tax.

**The Hydro-Electric Securities Corporation** announces a quarterly dividend of 30 cents per share on the common stock.

**The International Telephone and Telegraph Co.** has declared a quarterly dividend of 25 cents per share, as against 50 cents three months ago.

**The General Electric Co., Ltd.,** has announced that the whole of the outstanding 7 per cent. mortgage debenture stock will be redeemed on September 30th.

# Stocks and Shares

TUESDAY EVENING.

THE presentation of the second Budget this year, and the digestion of the heavy taxation imposed, have had the effect of lifting from the shoulders of Stock Exchange markets the weight of the suspense which had previously lain upon them. A Stock Exchange motto is: "Hope for the best and prepare for the worst," and it would seem as though the Budget is less oppressive than in advance it had been feared. For the immediate result was to bring about a general rise in the prices of all British Government securities, the 5 per cent. War Loan excepted. Theoretically, any increase in taxation is followed by depression in the prices of gilt-edged stocks and by improvement in those of more speculative propositions, the argument being that as taxation diminishes income, investment will prefer to take its chance with more speculative issues in which there is a prospect of price appreciation rather than continue to use its capital in the fixed-interest stocks upon whose dividends the taxes are levied. In the present case, however, what may be called the more speculative industrial shares have participated in the improvement led by the front rank securities. The talk of a duty upon imports has brought about material recovery in the shares of the iron, coal and steel market. In other industrial sections, lively interest is taken in what is likely to happen in the House of Commons this week.

## Home Electricity Shares

Proprietors of shares in the London Electricity Supply Companies are evidently satisfied with the position of their companies, and with the prospects for the future, because in almost every case the quotations are maintained at very much the same levels as those which have obtained over the past two months. Charing Cross ordinary have receded to 30s., this being the only alteration shown by shares in this group. Some of the preferences are, if anything, a little better. North Metropolitan Electric 6 per cent. preference hardened to 24s. 6d., reducing the yield on the money to a shade under 5 per cent. Nor is there any particular change in the shares of the provincial groups. Midland Electric Power at 27s. 6d. show a fall of 9d., but apart from this no changes have occurred.

## Floodlighting

The floodlighting of London continues to provide an excellent advertisement. Illumination of Buckingham Palace, St. James's Park, and Big Ben prove a nightly source of entertainment to crowds whose imagination can hardly fail to be stimulated by the exhibition of what can be done at a relatively small cost. The mild protests which were aroused at alleged extravagance on the part of the companies in thus utilising current, at a time when economy is the only cry in the air, are counteracted by consideration of the fact that extension of the use of electricity cannot fail to provide additional work in the many branches connected with the business.

## The Home Railway Market

The market in Home Railway ordinary has gone ahead, as regards the steam stocks, because it is considered that, if

there is to be a tariff on manufactured goods, this should have a favourable effect upon the earnings of Home Railway companies. Although this affects only indirectly the Underground stocks, the market for the latter is influenced by the tendency which prevails amongst the others. No quotable movements have occurred, however, in the Tube group of prices. London and Suburban Traction ordinary shares have fallen to the nominal price of 9d. The preference at 10s. are 1s. 6d. down.

## Dollar Stocks

The financial position in New York is far from happy, and the majority of dollar stocks show losses on the week. Brazilian Tractions have gone back to 14, being 2 down, and, of the Rio Tramway stocks, the 5 per cent. mortgage bonds are lower at 96½, the Seconds also being a point down at 81½. In the Mexican group, Light and Power common shares at 20 show a drop of 5. The second preference at 1 are ¾ down. In the Canadian section, the Power Corporation of Canada has done moderately well, allowing for the adverse conditions with which it has been faced. Net earnings were 9 per cent. lower than those in the previous year. The company earned 3.54 dollars on the common shares last year, against 4.21 dollars in the previous twelve months. The dividend is maintained at 2 per cent., and the price of the shares is 40. Shawinigan Water shares have receded to 37½, Pennsylvania Water and Power shares to 57½—a fall of 6 points—and Montreal Light and Power to 41½, which is 4½ points down. Calgary Power at 140 are also 5 points lower. Amongst foreign issues, Tokyo 6 per cent. bonds at 86½ are 2½ lower. The financial difficulties in Holland and in Germany are, of course, contributory causes to the weakness that has attacked utility stocks and shares, which, for several years, proved popular investments on the Continent.

## Cables and Wireless

Another fall of £1 in Great Northern Telegraphs has reduced the price to 22½, at which, assuming maintenance of the usual 20 per cent. dividend, the yield comes to 9 per cent. on the money. Globe Telegraph ordinary and preference are comparatively steady, and the Cables and Wireless group is without feature, except a decline of 1 in the 7½ per cent. "A" ordinary stock.

To those who are curious in such matters, it may be suggested that the cheapest way of acquiring an interest in Cables and Wireless stocks is through the purchase of Globe Telegraph and Trust ordinary shares. Study of the Trust's last-issued schedule of investments will show its holding of Cables and Wireless stocks to be such that, taking Globe ordinary £10 shares at the present quotation of 5½, this will practically give an interest in Cables and Wireless preference on a basis between 25 and 30, against the market price of 47½. The mention of this is not a suggestion that holders of Cables and Wireless preference should sell their stock and immediately reinvest the proceeds in Globe Telegraph and Trust ordinary. But where a purchase of the latter stock is contemplated, it will be to the advantage of the prospective investor to obtain a copy of the last-published Globe report and work out for himself the relative values of the three stocks of Cables and Wireless as represented by the present price of Globe ordinary shares.

Anglo-American Telegraph deferred stock is ¼ down. Marconi Marines are unchanged at 30s. The International Automatic Telephone Company has declared its usual 3¾ per cent. dividend, payable on October 1st. The price of the shares is 25s. middle. American Telephone and Telegraphs at 165 are 5 points down on the week, while International Telephone and Telegraph shares at 22 show a fall of 4 points. Western Union common shares at 105 have shed 5 points.

The General Electric Co., Ltd., announces that the outstanding mortgage debenture stock will be redeemed on 30th September next. The stock was originally issued ten years ago at 92½. Most of the holders took advantage of the Company's offer made last year to convert their 7 per cent. stock into an equivalent amount of 5 per cent. debenture stock, plus a cash payment of £4 per cent. Out of the original issue of 3½ million pounds stock, there is now outstanding only £880,000. The price of the 5 per cent. debenture stock is about 101½, which carries the half-yearly interest payment due immediately. The price of the shares is 1s. 9d. lower at 38s. Associated Electrical Industries ordinary have gone back to 18s. 9d. British Insulated ordinary at 2$\frac{7}{8}$ are $\frac{1}{8}$ down, although the Company is maintaining its interim dividend of 1s. per share, less tax, on the ordinary. In each of the past two years a final dividend of 10 per cent. has been declared, making 15 per cent. per annum. Enfield Cables are ½ lower at 3¾. British Aluminium at 21s. 3d. have lost 3s. 9d. The general run of manufacturing and equipment shares is still heavy. Johnson & Phillips have dropped 2s. 6d. to 26s. 3d. Telegraph Constructions at 10½ on the other hand replaced the fraction which they lost a week ago.

## Iron, Steel, and a Possible Tariff

A general rise has occurred in the prices of iron and steel shares due to the expectation that within the near future a tariff will be introduced upon manufactured articles. Vickers spurted to 8s. 3d. a rise of 1s. 6d. on the week. Babcock & Wilcox are 1s. 9d. better at 43s. 9d. A number of others have moved upward. The rubber share market is also a shade harder thanks to the produce again showing a slight advance.

# Share List of Electrical Companies

### HOME ELECTRICITY COMPANIES

| | Nom. | Approx. Dividend. 1929. | 1930. | Price, Sept. 15, 1931. | Rise or Fall. | Yield p.c. |
|---|---|---|---|---|---|---|
| | £ | | | | | |
| Bournemouth and Poole | 1 | 15 | 15 | 57/6 | — | 5 4 2 |
| Brompton Ordinary | 1 | 8½ | 8½ | 28/6 | — | 4 18 3 |
| Central Electricity 4½% Deb. | Stock | — | 4½ | 96 | +½ | 4 13 9 |
| Charing Cross Ordinary | 1 | 8½ | 8½ | 30/0 | —6d. | 4 13 4 |
| Chelsea | 1 | 8⅞ | 8⅞ | 28/– | — | 5 0 0 |
| City of London | 1 | 10 | 10 | 37/– | — | 5 8 1 |
| Clyde Valley | 1 | 8 | 8 | 30/– | — | 5 6 8 |
| County of London | 1 | 11 | 11 | 43/3 | — | 5 1 10 |
| Edmundsons' 7% Pref. | 1 | 7 | 7 | 26/– | — | 5 7 8 |
| Elec. Supply Corporation | 1 | 11 | 11 | 42/6 | — | 5 3 6 |
| Kensington Ordinary | 1 | 8 | 8 | 29/6 | — | 4 15 0 |
| Lancs. Light and Power | 1 | 7 | 6½ | 21/3 | — | 6 2 4 |
| London & Home Counties 4½% Deb. | Stock | — | — | 96 | — | 4 13 9 |
| London Electric | 1 | 8½ | 9 | 33/6 | — | 5 7 6 |
| Metropolitan | 1 | 9 | 10 | 39/6 | — | 5 1 3 |
| Midland Counties | 1 | 6½ | 7 | 27/– | — | 5 3 8 |
| Mid. Elec. Power | 1 | 15 | 8 | 27/6 | —9d. | 5 16 3 |
| Newcastle-on-Tyne Ordinary | 1 | 6 | 6 | 21/3 | — | 5 13 0 |
| Do. 7% Pref. | 1 | 7 | 7 | 27/6 | — | 5 1 10 |
| Notting Hill 6% Pref. | 10 | 6 | 6 | 11½ | — | 5 6 8 |
| North Met. Elec. 6% Pref. | 1 | 6 | 6 | 24/6 | +6d. | 4 18 0 |
| St. James' and Pall Mall | 1 | 8 | 8 | 29/6 | — | 4 15 0 |
| Scottish Power | 1 | 8 | 8 | 26/3 | — | 6 2 0 |
| South London | 1 | 8½ | 8½ | 27/6 | — | 5 1 10 |
| Urban Ordinary | 1 | 7 | 7 | 28/3 | — | 4 19 1 |
| Westminster Ordinary | 1 | 8½ | 8½ | 29/– | — | 4 16 7 |
| Whitehall Elec. Invst. 7½% Pref. | 1 | 7½ | 7½ | 24/9 | — | 6 0 9 |
| Yorkshire Elec. | 1 | 8 | 8 | 30/– | — | 5 6 8 |

### HOME RAILS

| | | | | | | |
|---|---|---|---|---|---|---|
| Central London Ord. Assented | Stock | 4 | 4 | 75 | — | 5 6 8 |
| Metropolitan | ,, | 4 | 3½ | 35½ | — | 9 17 2 |
| Do. District | ,, | 5 | — | 59½ | — | 8 8 0 |
| Underground Electric | 1 | 8 | 8 | 19/6 | — | 8 4 2 |

### TELEGRAPHS AND TELEPHONES

| | | | | | | |
|---|---|---|---|---|---|---|
| Anglo-Am. Tel. Pref. | Stock | 6 | 6 | 102½ | — | 5 17 1 |
| Do. Def. | ,, | 1½ | 1½ | 24¾ | —¼ | 6 6 4 |
| Cables & Wireless 5½% Pref. | Stock | 5½ | 5½ | 47½ | — | — |
| Do. A 7½% Ord. | ,, | Nil | — | 12 | —1 | — |
| Do. B Ord. | ,, | Nil | — | 7 | — | — |
| Globe Tel. and T. Ord. | 10 | 10 | 8½ | 5½ | — | — |
| Do. do. Pref. | 10 | 6 | 6 | 7½ | — | 8 5 6 |
| Great Northern Tel. | 10 | 20 | 20 | 22½ | —1 | 8 17 10 |
| Marconi-Marine | 1 | 15 | 15 | 30/– | — | 10 0 0 |
| Oriental Telephone Ord. | 1 | 12 | 12 | 2½ | — | *5 12 11 |

### HOME AND FOREIGN TRAMS, ETC.

| | | | | | | |
|---|---|---|---|---|---|---|
| Anglo-Arg. Trams First Pref. | 5 | 5½ | — | 7/6 | — | — |
| Do. do. 2nd Pref. | 5 | 6 | — | 6/3 | — | — |
| Do. do. 5% Deb. | Stock | 5 | 5 | 18 | — | — |
| British Electric Traction Def. Ord. | ,, | 5 | 5 | 700 | —50 | — |
| Do. do. Pref. Ord. | ,, | 8 | 8 | 122½ | — | 6 10 9 |
| Brazil Traction | 100 | 8 | — | 14 | —2 | — |
| Brit. Columbia Elec. Rly. Pce. | Stock | 5 | 5 | 96½ | — | 5 3 3 |
| London & Sub. Trac. 5% Pref. | 1 | Nil | Nil | 10/– | —1/6 | — |
| London United Tram Deb. | Stock | 4 | 4 | 60½ | — | 6 12 3 |
| Mexico Trams, 5% Bonds | — | 5 | 5 | 27½ | — | 18 3 8 |
| Mexican Light Common | 100 | Nil | Nil | 20 | —5 | — |
| Do. 7% Pref. | 100 | 7 | 7 | 50½ | — | 13 17 2 |
| Do. 1st Bonds | — | 5 | 5 | 57½ | — | 8 13 10 |
| Victoria Falls Ord. | 1 | 15 | 15 | 57/6 | — | 5 4 4 |
| Yorkshire (West Riding) | 1 | Nil | Nil | 6/3 | — | — |

### MANUFACTURING COMPANIES

| | | | | | | |
|---|---|---|---|---|---|---|
| Assoc. Elec. Ord. | 1 | 6 | 6 | 18/9 | —9d. | 6 8 0 |
| Do. Pref. | 1 | 8 | 8 | 28/3 | — | 5 12 3 |
| Babcock & Wilcox | 1 | 15 | 14 | 43/9 | +1/9 | *6 8 0 |
| British Aluminium Ord. | 1 | 10 | 10 | 21/3 | —3/9 | 9 8 2 |
| British Insulated Ord. | 1 | 15 | 15 | 2⅞ | —⅛ | 6 2 6 |
| Brush Ord. | Stock | 10 | 5 | 60 | — | 8 5 0 |
| Callenders | 1 | 15 | 15 | 2¼ | — | 6 6 4 |
| Do. 6½% Pref. | 1 | 6½ | 6½ | 26/3 | — | 4 19 1 |
| Crompton Parkinson Ord. | 5/– | 30 | 30 | 1 | — | 7 10 9 |
| Do. 8% Pref. | 1 | 8 | 8 | 28/3 | — | 5 13 3 |
| Edison-Swan 1st Pref. | 1 | 7½ | 7½ | 22/9 | — | 6 11 10 |
| Do. 5% Deb. | Stock | 5 | 5 | 92½ | — | 5 8 1 |
| Electric Construction | 1 | 5 | Nil | 10/– | — | — |
| Enfield Cable Ord. | 1 | 25 | 25 | 3¾ | —¼ | 6 13 4 |
| English Electric | 1 | Nil | Nil | 5/– | — | — |
| Do. do. Pref. | 1 | Nil | Nil | 5/– | — | — |
| Ferranti Pref. | 1 | 7 | 7 | 20/3 | — | 6 18 3 |
| G.E.C. Pref. | 1 | 6½ | 6½ | 23/6 | —1/6 | 5 10 8 |
| Do. Ord. | 1 | 14 | 10 | 38/– | —1/6 | 5 5 0 |
| Henley | 1 | 30 | 30 | 4¼ | | 6 10 5 |
| Do. 4½% Pref. | 5 | 4½ | 4½ | 4⅝ | — | 5 2 10 |
| India-Rubber | 1 | Nil | Nil | 4/6 | — | — |
| Johnson & Phillips | 1 | 10 | 10 | 26/3 | —2/6 | 7 12 4 |
| Siemens Ord. | 1 | 7½ | 7½ | 20/– | — | 7 10 0 |
| Telegraph Construction | 12 | 10 | 7½ | 10½ | +½ | 8 11 |

* Dividends paid free of Income Tax.

# Our Foreign Electrical Trade

## Imports and Exports during August

THE decline in exports from and imports into this country continued during August, but while exports fell by 32 per cent., as compared with the corresponding month of last year, imports were only 18 per cent. lower.

So far as the electrical trade is concerned, the figures show that exports declined to a greater proportional extent than imports. Electrical exports at £781,785 were 37 per cent. lower than in August, 1930, and imports only 17 per cent. lower.

Our larger table shows that the August export total fell short of the July figure by £238,446, but this was partly accounted for by the fact that August included five Sundays and a Bank Holiday. There was, however, a rise in cable imports, which falling values have badly hit during the past year or two. Arc lamps, a relatively unimportant item, also made a slight advance. For the rest of the items decreases of different sizes were shown. Telegraph and telephone apparatus reached a very low level, and submarine cables (an ever-varying item) were responsible for £50,000 of the decrease. The machinery section as a whole declined by about £23,000, but this can be attributed to the shorter month. Large falls occurred in the cases of unenumerated goods, meters and instruments, and glow lamps.

As compared with August, 1930, only one item was higher; this was submarine cables, exports of which fell to practically nothing in August last year. The greatest decrease occurred in the machinery section which, taken as a whole, showed a fall of £188.355. There were several other large declines, notably in exports of unenumerated goods, insulated wires and cables, and telegraph and telephone apparatus.

The inset table shows how the fall in the value of electrical machinery exports was spread over the various purchasing countries. The most serious feature of these figures is the reduction in the shipments to Australia, amounting to over 90 per cent.; in the first eight months of the current year, Australia's purchases of British electrical machinery have declined in value from £567,333 to £104,847. India, formerly our leading market, was also for various reasons a bad customer in August, showing a two-thirds reduction in purchases; New Zealand halved her imports of British electrical machines; while Canada's and South Africa's shares also fell below the 1930 level.

It is noteworthy that European and South American countries took machinery of a higher value than in August, 1930, although in both cases there was a reduction in volume. Japan, pursuing her policy of home production, cut down her purchases still further. In the first eight months of the year Japan's share of this trade was valued at £14,550, as compared with £180,183 and £56,675 in the corresponding periods of 1929 and 1930. It will be observed that while the volume of machinery exports declined by 48 per cent., their value fell by only 38 per cent. The value per ton thus rose from £157 in August, 1930, to £187 last month.

Turning to the import section, it will be seen that, although the month was shorter, there were increases in four items as compared with July; two of these were of a fairly substantial nature, the items affected being batteries and accumulators and meters and instruments. The greatest decline was shown against machinery; in fact, this was the only decrease of any significance.

### Electrical Machinery Exports

| Destination. | Quantities. Aug., 1930. Tons. | Aug., 1931. Tons. | Decrease. Tons. | Values. Aug., 1930. £ | Aug., 1931. £ | Increase or Decrease. £ |
|---|---|---|---|---|---|---|
| Europe .. .. .. | 738 | 689 | 49 | 136,272 | 143,134 | + 6,862 |
| Japan .. .. .. | 18 | 5 | 13 | 3,355 | 1,334 | — 2,021 |
| South America .. .. | 146 | 140 | 6 | 24,099 | 28,460 | + 4,361 |
| South Africa .. .. | 223 | 155 | 68 | 28,150 | 25,253 | — 2,897 |
| British India .. .. | 690 | 169 | 521 | 98,284 | 31,094 | —67,190 |
| Australia .. .. | 418 | 30 | 388 | 62,729 | 5,910 | —56,819 |
| New Zealand .. .. | 96 | 37 | 59 | 13,643 | 6,591 | — 7,052 |
| Canada .. .. .. | 355 | 75 | 280 | 44,617 | 13,746 | —30,871 |
| Other Countries .. | 455 | 337 | 118 | 83,288 | 50,560 | —32,728 |
| Totals .. .. | 3,139 | 1,637 | 1,502 | £494,437 | £306,082 | —£188,355 |

In the comparison with August last year, the net decrease of £108,789 was fairly general, there having been only two rises. Meters and instruments were responsible for more than half of the decrease, and only two other items—electrical machinery and glow lamps—fell to any considerable extent. Machinery imports reached the lowest level touched since September, 1926.

It will be observed from our table that there was a decrease of £4,086,960 in the value of exports during the first eight months of the year. Electrical machinery declined from £4,346,481 to £2,853,924, there being a fall of £975,555 on unenumerated machinery.

Total exports of electrical goods and apparatus for the eight months amounted in value to £5,318,030, as compared with £7,912,433 in the corresponding period of last year. This decrease is largely attributable to a very considerable falling-off in exports of insulated cables and wires, the value of which declined by £1,153,380 to £996,912. Large decreases are also recorded in the exports of electric glow lamps (from £430,697 to £248,439), arc lamps and parts (from £14,993 to £7,268), and switchboards (from £55,223 to £29,193). The only section which shows an increase is electric carbons, which rose from £8,836 to £10,544.

| | Exports. Electrical exports for August, 1931. | Inc. or dec. as compared with July, 1931. | Inc. or dec. as compared with August, 1930. | Imports. Electrical imports for August, 1931. | Inc. or dec. as compared with July, 1931. | Inc. or dec. as compared with August, 1930. | Re-Exports. Electrical re-exports for August, 1931. | Inc. or dec. as compared with July, 1931. | Inc. or dec. as compared with August, 1930. |
|---|---|---|---|---|---|---|---|---|---|
| Electrical goods and apparatus (unenumerated) .. .. | £112,176 | —£51,966 | —£80,654 | £130,937 | —£18,089 | — £422 | £5,313 | —£1,064 | —£1,989 |
| Insulated cables and wires .. | 112,297 | + 3,453 | — 69,571 | 61,016 | — 6,251 | — 3,757 | 293 | + 5 | + 89 |
| Glow lamps .. .. .. | 19,370 | — 18,629 | — 24,369 | 33,167 | — 6,295 | —20,817 | 216 | — 21 | — 313 |
| Arc lamps and parts .. .. | 694 | + 442 | — 784 | 4,618 | + 462 | + 2,791 | 12 | — 78 | + 12 |
| Batteries and accumulators .. | 48,000 | — 27,368 | — 19,096 | 60,598 | + 13,242 | — 560 | 403 | — 1,077 | — 114 |
| Meters and instruments .. | 21,977 | — 5,410 | — 9,756 | 36,614 | + 13,366 | —59,173 | 863 | + 424 | — 3,871 |
| Carbons .. .. .. .. | 366 | — 938 | — 1,006 | 14,223 | — 1,498 | — 689 | 105 | — 593 | — 603 |
| Switchboards (not telegraph or telephone) .. .. .. | 1,302 | — 6,081 | — 3,281 | 28 | + 28 | — 476 | 30 | — 48 | + 30 |
| *Electrical Machinery—* | | | | | | | | | |
| Electrical machinery (unenumerated) .. .. .. | 162,633 | — 17,639 | —146,826 | 85,414 | — 48,682 | —34,549 | 5,623 | — 2,211 | —11,230 |
| Railway and tramway motors .. | 2,083 | — 5,061 | — 9,423 | — | — | — | — | — | — |
| Other motors and generators .. | 141,366 | — 125 | — 32,106 | — | — | — | — | — | — |
| *Telegraph and Telephone Cable and Material—* | | | | | | | | | |
| Telegraph and telephone wires and cables (not submarine) .. | 27,774 | — 5,835 | — 33,362 | 1,583 | — 1,095 | — 90 | 2 | — 35 | + 2 |
| Submarine telegraph and telephone cable .. .. .. | 5,208 | — 50,824 | + 5,064 | — | — | — | — | — | — |
| Telegraph and telephone apparatus .. .. .. | 126,539 | — 52,465 | — 38,642 | 104,873 | — 5,650 | + 8,953 | 5,403 | — 940 | —31,462 |
| Total .. .. .. | £781,785 | —£238,446 | —£463,812 | £533,071 | —£60,462 | —£108,789 | £18,263 | —£5,638 | —£49,449 |
| Decrease for first eight months of the year .. .. .. | Exports £4,086,960 | | | Imports £1,464,000 | | | Re-Exports. £220,147 | | |

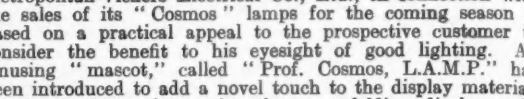
# The Lighting Season

## Display Material for 1931-1932

A "Cosmos" Window Display

AS in past years the General Electric Co., Ltd., has arranged a very comprehensive programme in regard to the manufacturing and marketing of "Osram" lamps for the coming season. The "simplified line" of "Osram" lamps, consisting of 15, 25, 40, 60 and 100 watts, will constitute the main feature in the programme, the pearl type again prevailing. In addition to these there are available natural coloured and colour-sprayed lamps for advertising and decorative purposes, candle and "Gothic" lamps, tubular and strip-lighting lamps, "Osglim" neon lamps, and a complete range of gas-filled projector lamps, as well as lamps for sound film apparatus, marine and traction use, and other special purposes. Dealers will be provided with a comprehensive selection of sales aids, consisting of overprinted literature, window display cut-outs and material, backed up by expert technical service on all questions concerning illumination, all of which are fully set out in an attractive broadside. A special feature of this season's publicity campaign is a strikingly designed "Elephant" poster which is to be seen in the window display shown. The selling programme will, as usual, be backed by extensive Press advertising.

Most of the advertising display material issued by the Metropolitan-Vickers Electrical Co., Ltd., in connection with the sales of its "Cosmos" lamps for the coming season is based on a practical appeal to the prospective customer to consider the benefit to his eyesight of good lighting. An amusing "mascot," called "Prof. Cosmos, L.A.M.P." has been introduced to add a novel touch to the display material, and he is featured prominently on a folding display unit, about 18 in. high. This year's showcard is a very attractive design, including a "Cosmos" pearl lamp, while a comprehensive little folder contains prices of all lamps in common use, and helpful information on lighting values and decorative




A Typical "Osram" Window Display

schemes. The latter can be supplied overprinted with the dealer's name and address. A window streamer is also available, and a certain number of complete outfits for constructing the window display will be provided. Automobile lamps will be illustrated on a brightly printed showcard, the usual folder having been re-issued with a very original modern-style cover, also suitable for overprinting. The complete lamp catalogue contains a list of all lamps sold, together with prices, illustrations, dimensions, etc., and is punched so that it can be hung up for easy reference.

# Indian Electrical Imports

## Machinery Purchases Maintained: Electrical Apparatus Values Decreased

A SURVEY of the import trade of India for the first quarter of the fiscal year (April to June) prepared by H.M. Trade Commissioner at Calcutta, and published by the Department of Overseas Trade, shows that during the three months under review the value of imports decreased to Rs. 36 crores, a falling off of Rs. 14 crores, or 28 per cent. as compared with the corresponding period of 1930. The total exports, including re-exports, fell by Rs. 27 crores, or 40 per cent., to Rs. 40 crores. Re-exports of Indian merchandise showed a decline of Rs. 27 crores, or 40 per cent., to Rs. 40 crores, and re-exports also decreased by Rs. 30 lakhs, or 20 per cent. The total of imports, exports and re-exports amounted to Rs. 76 crores, as compared with Rs. 117 crores, a decrease of 35 per cent. The total imports of machinery and millwork declined from Rs. 426 lakhs to Rs. 310 lakhs, and the United Kingdom's share from Rs. 330¼ lakhs to Rs. 215½ lakhs. The decline in the British share was due to decreased imports of locomotives, electrical machinery, boilers, metal working machinery, etc. There was, however, an increase in the imports from the United Kingdom of mining, oil crushing and refining machinery. The imports of electrical machinery were valued at Rs. 66 lakhs, against Rs. 63½ lakhs in the corresponding period of 1930. The imports of electrical instruments, apparatus and parts, fell from Rs. 84¾ lakhs to Rs. 69¾ lakhs, the British share declining from Rs. 47 lakhs to Rs. 35¾ lakhs. Reductions also occurred in the cases of the United States (from Rs. 12½ to Rs. 8½ lakhs), Japan (from Rs. 2¼ to Rs. 1¾ lakhs), and Italy (from Rs. 3¼ lakhs to Rs. 1½ lakhs). On the other hand the imports from Germany increased slightly from Rs. 9¼ to Rs. 10 lakhs, from the Netherlands from Rs. 3¼ to Rs. 4¾ lakhs, and "other countries" from Rs. 5½ to Rs. 7 lakhs.

There was a heavy drop in imports of electric fans and parts, from Rs. 10¼ to Rs. 5½ lakhs, the United Kingdom share being reduced from Rs. 5¾ to Rs. 3¾ lakhs. The imports of electric wires and cables were reduced by Rs. 7¾ lakhs to Rs. 18¼ lakhs. The United Kingdom supplied Rs. 12¼ lakhs Germany Rs. 1½ lakhs, the United States Rs. 1¼ lakhs, and small quantities were supplied from the Netherlands and Japan.

The principal imports of electric lamps are under the headings of gasfilled electric bulbs and vacuum electric bulbs. In the former the total trade amounted to Rs. 4½ lakhs, the United Kingdom supplying Rs. 2 lakhs, the Netherlands Rs. 1½ lakhs, and Germany, Japan and the United States small quantities. In vacuum lamps, the trade amounted to Rs. 5¼ lakhs, the principal suppliers being the United Kingdom (Rs. 1½ lakhs), the Netherlands (Rs. 1¾ lakhs), "other countries" (Rs. 1 lakh), with small imports from Germany, Japan and the United States. The imports of electric batteries totalled Rs. 2¾ lakhs, the principal supplier being the United States with Rs. 1¼ lakhs, the United Kingdom's share being Rs. ½ lakh.

Under the heading of accumulators, the imports increased to Rs. 4½ lakhs (against Rs. 3½ lakhs), Rs. 3¼ lakhs being drawn from the United Kingdom. Electric lighting accessories and fittings (including switches) totalled Rs. 3 lakhs, of which Rs. 1¼ lakhs were imported from the United Kingdom, and Rs. 1 lakh from Germany. The imports of meters from the United Kingdom dropped from Rs. 1¾ lakhs to Rs. 1 lakh, and accounted for the decrease in the total trade from Rs. 2¼ to Rs. 1¾ lakhs. Electro-medical apparatus (including X-ray apparatus) was imported to the value of Rs. ¾ lakh, the United Kingdom's share being Rs. 17,000, the United States Rs. 18,000, and "other countries" Rs. 39,000. The imports of switchboards, practically all of which came from the United Kingdom, remained steady at Rs. ¾ lakh.

Unenumerated electrical goods and apparatus attained a total of Rs. 12¾ lakhs, of which Rs. 7½ lakhs came from the United Kingdom, Rs. 2¾ lakhs from the United States, Rs. 2¼ lakhs from Germany, and Rs. ¾ lakh from "other countries."

Wireless apparatus imports increased slightly from Rs. 1¼ to Rs. 1¾ lakhs, the United Kingdom's share increasing from Rs. ¾ to Rs. 1 lakh. There were small imports from Germany, the Netherlands and the United States.

# Correspondence

*Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession*

## Cable-manufacturing Developments

In your issue of August 21st, 1931, there is described a new type of lead press for the sheathing of cables whereby the lead stream does not part and reunite in the container. I do not agree that it has the revolutionary character which appears to be claimed for it, inasmuch as the parting and reuniting of the lead stream in the container, or strictly speaking in the extrusion chamber, is not the real difficulty with which cable makers are faced to-day on a modern cable covering press.

The real difficulty is that the total weight of lead required to cover a large cable necessitates the lead container being recharged four or five times, sometimes more, depending, of course, upon the weight of lead required per yard and the length of the cable.

The new charge of lead introduced into the container never unites to the residue of the old charge, which naturally remains in the bottom of the container, the reason for this being that the surface of the old charge has become oxidised by exposure to the atmosphere, as can easily be proved as follows:—Take a small ladle full of molten lead, pour a small quantity of this into a shallow vessel, hesitate a second to allow it to solidify, and then pour out the remainder on the top of the solidified portion. Now take the whole of the casting and subject it to any pressure, no matter how great, but the two portions will never unite. Even if it is put under a powerful hammer and reduced to a mere flake, it will be found that the upper portion can be parted from the lower portion.

This, then, is the real difficulty. Various methods of overcoming it have been suggested from time to time. One, very simple in its inception, is to have a container large enough to cover the largest and longest length of cable with one charge of lead, but the size of the press required renders it impracticable. Manufacturers of tubes made of lead, or of copper and its alloys, are not faced with this problem, simply because the charge in the container is always large enough to make the longest tube required.

In the press described in the article referred to no attempt is made, apparently, to unite the two charges, the idea being so to elongate the joint that it becomes almost invisible. I can agree that this new design of press may give a better result than that shown in Fig. 5 as an "ordinary press," but I cannot agree that this is an ordinary press, as it is very similar to the one designed by Mr. Alexander Wylie about 1895, and there have been many and great improvements in cable-covering presses since that date. To overcome the difficulty of the lead stream dividing and reuniting, the inventor passes the cable through the container so that the charge of lead is already in the form of a tube and has simply to be reduced at the extrusion chamber to the size required to fit the cable.

In the new design no claim is made to unite these, the idea being so to elongate the joint that it becomes almost invisible by spreading it over a distance of about twenty yards of the cable, or in other words the cable has, at these points, two separate and distinct coverings consisting of part of the new and part of the old charges.

It seems to me that these two coverings cannot always be relied upon entirely to envelop the cables, and that they will sometimes break out on the inside and sometimes on the outside of the tube. In a modern cable press this joint is so dispersed and broken up that it is almost impossible to find it. I do not say it does not exist, it does, and will continue to exist until it is possible to avoid the intermittent charging of the press and introduce the lead in a continuous flow whilst the cable is being covered. Many attempts have been made at this, and one day they will be successful. I shall be pleased to give any further information or answer any inquiries if it is in my power to do so.

J. STRATTON, M.I.Mech.E.,
*Managing Director*, Alliance (Manchester) Limited.

Manchester, *September 7th*, 1931.

[This letter has been abridged.—EDS., ELECTRICAL REVIEW.]

## Power in Industry

With reference to your article bearing the title of "Power in Industry," which appeared in your issue of September 11th, it is interesting to have figures from Government Departments outside the electricity supply industry, although, of course, the figures published by the Electricity Commissioners are official.

The following table, extracted from their volumes, shows clearly the position up to date; the fact that the price for this power has been halved during the past few years is really the kind of propaganda which is now required.

**Electricity purchased from public supply undertakings for power purposes.**

| | kWh sold (millions). | Revenue £1,000. | Average price per kWh sold. |
|---|---|---|---|
| Year 1921–22 .. .. | 2,014.0 | 14,189 | 1.69 |
| „ 1922–23 .. .. | 2,444.8 | 13,190 | 1.30 |
| „ 1923–24 .. .. | 3,067.5 | 14,525 | 1.14 |
| „ 1924–25 .. .. | 3,503.7 | 15,614 | 1.07 |
| „ 1925–26 .. .. | 3,760.1 | 15,591 | 1.00 |
| „ 1926–27 .. .. | 3,767.1 | 17,839 | 1.14 |
| „ 1927–28 .. .. | 4,537.6 | 17,681 | 0.94 |
| „ 1928–29 .. .. | 4,926.6 | 17,635 | 0.86 |
| „ 1929–30 .. .. | 5,408.0 | 18,420 | 0.82 |

*September 12th*, 1931. ALL-ELECTRIC DRIVE.

## Gas and Electricity

At the time of the Faraday Centenary Celebrations it may be of interest to call attention to the daily occasions upon which gas and electricity are to be found in juxtaposition.

Two notable examples of co-operation between the two industries are: (1) the use of electric flash lamps by gas-meter inspectors, an electrical application which enables these men to pursue in safety what might otherwise be an extremely dangerous calling; and (2) the employment in internal combustion engines (which are, of course, really gas engines) of electric ignition, a co-operative effort without which the present motor cars of the world would come to a standstill; this is at least an example of electricity making gas do useful work!

On my own suburban railway line, which runs from Euston, I find, however, that although electricity is available to an unlimited extent for the operation of the trains, the majority of the stations, booking halls and waiting-rooms on the electrified section are lighted (?) by gas.

W. E. WARRILOW.

Oxhey, Herts, *September 11th*, 1931.

[These are instances of electricity facilitating the work of gas. A notable instance of the help that can be given by gas to electricity is to be found in the use of coke breeze at Deptford power station and elsewhere. The coke breeze is very suitable for steady loads, *e.g.*, electric water heaters.—EDS., ELECTRICAL REVIEW.]

## Engineering Mathematics

Mr. Ashmawy seems to agree that many engineers have lost the mathematical technique which they acquired at college. Surely, if this is so, the time spent in obtaining skill in mathematical manipulation has been largely wasted, and might more profitably have been devoted to subjects which have some cultural value.

G. W. STUBBINGS.

London, S.E., *September 12th*, 1931.

**The Stands of British Insulated Cables, Ltd., and the British Thomson-Houston Co., Ltd., at the Engineering Exhibition.**

# Book Reviews

**Foundations of Radio.** By RUDOLPH L. DUNCAN. Pp. ix+246; figs. 145. London: Chapman & Hall, Ltd. Price 12s. 6d.

All teachers know well that short cuts to knowledge are almost certain to end in blind alleys. Mr. Duncan has been a teacher of radio-telegraphy in the United States and sets out in this book to guide the student on to the broad highway, and he deals therefore, not with radio-telegraphy, but with the "fundamentals of electricity and allied subjects which are 'stepping stones' that must be first understood before a comprehensive knowledge of radio can be expected." It is a book on elementary electricity and magnetism, or rather on as much of those subjects as are essential to form a foundation for the study of radio-telegraphy. It includes, too, a chapter on sound, a chapter on preparatory mathematics (fractions and square roots) and an appendix of electrical tables.

The explanations throughout are clear and simple, and the figures used to illustrate the text are excellent. A good set of problems is given at the end of each chapter. Altogether the idea of the book is good and it is well carried out. We should have liked, however, to have seen something included on accumulators in addition to the chapter on primary cells, and something more on light in addition to what is given on sound, or even at the expense of some of that chapter. More space, too, might have been given to capacity and inductance which loom so large in the fundamental principles of radio-telegraphy.

To meet these suggestions the size of the book would have had to be increased, unless, indeed, the preparatory mathematics and appendix had been omitted. The former could be readily obtained elsewhere and the latter would be more usefully placed in a more advanced textbook.

This is just the sort of book which we would like to see in the hands of students who, devoid of electrical background, wish to understand the principles of radio-telegraphs, and who so often, unfortunately, plunge straight into a textbook which they cannot possibly understand.

**Internationale Sprachnormung in der Technik,** besonders in der Elektrotechnik (international language standardisation in engineering, with special reference to electrical engineering). By DR. E. WUESTER. Berlin: V.D.I.-Verlag, published with the assistance of the Akademie des Bauwesens. Pp. xv+431, with four tables. Price, linen cover, RM. 20.

The author starts by investigating the structure of engineering terms in the several principal languages, proposes criteria for their economic quality or terminological value, and classifies the methods of the various international engineering bodies into three grades of three sub-divisions each. The first grade is the "coupling" of national terms, *i.e.*, the co-ordination or relating of conceptions, and the highest sub-grade of it is the unification of conceptions, such as, for instance, of the basic meanings of translated expressions. The second grade concerns the use of internationally equal sound forms or so-called "international words." The third grade is the introduction of a completely international language, whether existing, such as English, or artificial, as Esperanto.

The limitations of the various methods are shown. International adoption of a national language (sub-grade of grade 3) would be both uneconomic and unjust; the most truly economic and the most just solution, according to the author, is, not to standardise national sound forms (grade 2), but national conception forms. It is not possible, however, to render standardised conceptions by coupled national sound forms under grade 1, because national languages will not stand being flooded with so many foreign conception forms. The only remaining way out is to assign to the elements of conception forms sound forms as nearly international as possible, and systematically to erect from these relatively few word elements a new international engineering language (highest sub-grade of grade 3). Numerous examples demonstrate the proposed method.

**Elementary Electricity.** By E. P. SLACK. Pp. ix+278; figs. 218. London: McGraw-Hill Publishing Co., Ltd. Price 10s. net.

This book, by an American professor of physics, is intended for use in vocational and industrial schools by students who have not studied electricity before and whose mathematical training may not have gone beyond arithmetic. The hydraulic analogy to the flow of the electric current is freely used in the early part of the book, and by this means, and by the use of well-drawn diagrams, the author succeeds in conveying a very clear impression of elementary electrical phenomena.

The three chapters on current, resistance and voltage suffice to bring the student to the point at which he is introduced to the dynamo and motor, both of which receive a thorough treatment, the only weakness of any importance is the neglect to treat adequately the subject of materials used in magneto-electric machinery, especially in the magnetic circuit. With the exception of copper, to which considerable attention is given, practically no reference is made to the functions of the different materials used in electrical construction.

Alternating currents, together with distribution systems and polyphase apparatus, are treated very satisfactorily, good diagrams again adding greatly to the ease and clearness of treatment. A final chapter is devoted to a brief but sound treatment of radio reception and vacuum tubes. The latter is interpreted to mean a valve in the "wireless" sense, and no reference is made to other uses of vacuum tubes such as X-rays.

An important feature of the book is the inclusion at the end of each chapter of a series of problems and questions. There are about 250 of these questions, and the student who worked these conscientiously would undoubtedly have acquired a good basic knowledge of applied electricity.

The production is in the style usually associated with the Mc Graw-Hill Company, and leaves nothing to be desired except a little cheapening in price to put it within the reach of the average technical school student.

# Parliamentary Notes

[By Our Special Parliamentary Reporter]

## The Budget

The House of Commons reassembled on Tuesday, September 8th, and Mr. Snowden introduced his Supplementary Budget on September 10th. Briefly, this provides for meeting estimated deficits of £74,000,000 this year, and £170,000,000 next. To meet the position, economies amounting to £22,000,000 this year and £70,000,000 in a full year, will be effected, the remaining deficit being met by saving on debt amortisation, and new taxation. The new taxation includes an addition of 6d. to the standard rate of income tax (making it 5s. in the £1), with reduced allowances, and 10 per cent. on sur-tax; 2d. a gallon on petrol; 1d. a pint on beer; 8d. a lb. on tobacco; and increased entertainment tax. To avoid placing further tax burdens on industry it is proposed that depreciation allowances shall be increased so as to keep the net income tax at the existing level.

## The National Electricity Schemes

On September 10 MR. DAY asked the Minister of Transport whether the whole of the ten schemes evolved under the Electricity (Supply) Act, 1926, covering Great Britain, had now been completed; and if he could give particulars of the total amount of expenditure involved in those schemes.

MR. PYBUS said that the Electricity Commissioners had prepared and transmitted to the Central Electricity Board nine schemes under the provisions of Section 4 of the Electricity (Supply) Act, 1926. Those schemes, which covered the whole of Great Britain except Northern Scotland, had all been adopted by the Board and were being carried into execution. A scheme for Northern Scotland was at present under preparation by the Electricity Commissioners, who hoped to transmit it to the Central Board before the end of the current year. The expenditure involved in carrying out the nine schemes could not yet be ascertained as the work was still in progress, but the estimated amount was approximately £29,000,000 on the transmission system and £19,000,000 gross on standardisation of frequency.

# Legal

## Breach of Electricity Regulations

MESSRS. A. H. BISBEY AND CO., LTD., cutlery manufacturers, Sheffield, were summoned at the Sheffield Police Court last week for failing to comply with certain electricity regulations. It was stated that the company took an alternating current supply 200 v. from the Sheffield Corporation. On July 1st an electrical engineer was killed at the works while standing on a grinding machine on a wet concrete floor. As he was reaching up to the belt on a pulley he got hold of a bracket carrying shafting and received a fatal electric shock. Tests made two hours later revealed an intermittent fault in the motor starter due to leakage, the casing carrying the electrical cables being in contact with the bracket.

THOMAS COOPER, an employé of the firm, said that the day before the accident he had no reason to think that anything was wrong with the electrical machinery. After the accident he found that the casing had been earthed with a wire which had become disconnected.

MR. F. W. SCORAH, for defendants, said the reason that the machine had become alive was that there was a very small wedge in the starter which had become slightly loose so that it sometimes performed its function and at others formed a circuit. This would not have led to the accident if the earth wire had been intact. There had been no neglect on the part of the firm, and nothing could have been done to prevent the accident. The Bench imposed a fine of £20.

## An Irish Council Fined

AT Coleraine (Co. Londonderry), last week, Mr. R. Browne, Portstewart, summoned the Portstewart Urban District Council for refusing to give him an electricity supply.

MR. BROWNE stated in evidence that he had requested the Council to supply electricity to his new house, but the Council declined to do so until an amount of 18s. 6d., owing by a tenant to whom Mr. Browne had let another house, had been paid. The Council was ordered to pay a fine of 2s. 6d. for each day the supply was withheld—from August 17th to 29th—and £1 costs. Notice of appeal was given.

# Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specification will be printed and abridged, and all subsequent proceedings will be taken.

**1930.**

4,797. "Dynamo-electric transmission gear." W. W. Triggs (Maschinenfabrik Augsburg-Nurnberg Akt.-Ges.). February 12th, 1930. (355,270.)

8,526. "Electric hand-lamp for motor vehicles." A. Schoeller. March 17th, 1930. (355,304.)

8,675. "Slotted cores for a.c. dynamo-electric machines." Ateliers de Constructions Electriques de Charleroi. March 21st, 1929. (355,215.)

8,819. "Commutator dynamo-electric machines." B. C. Von Platen. March 19th, 1929. (355,274.)

9,241. "Receiver horns and sound-receiving apparatus." A. E. White (Sperry Gyroscope Co., Inc.). March 22nd, 1929. (355,305.)

9,722. "Electro-magnetic switches." F. Whipp, Whipp & Bourne, Ltd., and Mather & Platt, Ltd. March 27th, 1930. (355,367.)

11,598. "Apparatus for distant electric control." M. B. Sleeper. April 11th, 1930. (355,216.)

14,333. "Loud-speaker motors." C. W. Peterson. May 9th, 1930. (355,315.)

14,414. "Luminous indicators for electric switches." A. Collinson. May 10th, 1930. (355,218.)

14,578. "Machines for making electric lamp bulbs and the like." British Thomson-Houston Co., Ltd. May 11th, 1929. (355,220.)

15,018. "Mounting of vibrating reeds, more particularly for use in connection with electromagnetic gramophone pick-ups, loud-speakers and the like." P. Wilson. May 15th, 1930. (Patent of addition not granted.) (355,227.)

15,156. "Apparatus for reproducing sound from sound-record films." W. A. Robinson and Corolectric, Ltd. May 16th, 1930. (355,260.)

15,202. "Thermally-actuated electric switches." R. Collier and British Motor Sign Co., Ltd. May 17th, 1930. (355,228.)

15,367. "Electric supply apparatus for use in medical or dental therapeutics." P. D. Bernard. July 19th, 1929. (355,250.)

15,387. "Taping machines for electric cables and the like." A. Carpmael (Soc. Anon. Ing. V. Tedeschi & Co.). May 19th, 1930. (355,251.)

15,526. "Electric condensers." British Insulated Cables, Ltd., and B. Welbourn. May 20th, 1930. (355,326.)

15,623. "Thermionic vacuum tubes." Standard Telephones & Cables, Ltd. (W. T. Gibson and A. H. Boulestreau). May 21st, 1930. (355,290.)

15,624. "Electric cables." Standard Telephones & Cables, Ltd., H. S. Moody, and T. R. Scott. May 21st, 1930. (355,291.)

15,697. "Duplex telegraph systems." Western Electric Co., Ltd., and Electrical Research Products, Inc. (Bell Telephone Laboratories, Inc.). May 21st, 1930. (Addition to 341,528.) (355,297.)

15,779. "Thermionic valves." Lissen, Ltd., and R. P. Richardson. May 22nd, 1930. (355,336.)

15,805. "Train-control systems." Associated Telephone & Telegraph Co. July 11th, 1929. (355,337.)

15,896. "Electric high-frequency signalling systems." Standard Telephones & Cables, Ltd. (Western Electric Co., Inc.). May 23rd, 1930. (355,339.)

15,945. "Electrical insulators." J. E. Pollak (Hermsdorf-Schomburg Isolatoren Ges.). May 23rd, 1930. (355,343.)

15,955. "Circuit arrangements for electric amplifiers." J. J. Numans. February 25th, 1930. (355,346.)

16,046. "Electrical signalling systems employing magnetically-loaded cables." Electrical Research Products, Inc. May 25th, 1929. (Addition to 296,979.) (355,352.)

16,294. "Manufacture of magnetically-loaded electrical conductors." Western Electric Co., Ltd., and Electrical Research Products, Inc. (Bell Telephone Laboratories, Inc.). May 27th, 1930. (Addition to 306,543.) (355,373.)

17,170. "Searchlights." A. White (Sperry Gyroscope Co., Inc.). June 4th, 1930. (355,393.)

17,458. "Electric discharge devices." British Thomson-Houston Co., Ltd. June 27th, 1929. (355,401.)

17,678. "Acoustic diaphragms." Gramophone Co., Ltd., and A. S. Radford. June 6th, 1930. (355,405.)

18,038. "Circuits and apparatus for the electrical control of light." General Electric Co., Ltd., and W. H. Peters. June 12th, 1930. (355,408.)

18,260. "Battery ignition apparatus." R. Bosch Akt.-Ges. July 4th, 1929. (355,411.)

20,517. "Indicators operated electromagnetically." Siemens Bros. & Co., Ltd., and W. H. Grinsted. July 7th, 1930. (355,440.)

21,270. "Magnetic alloys." Callender's Cable & Construction Co., Ltd., and S. Beckinsale. July 14th, 1930. (355,456.)

24,913. "Dynamo-electric machines." T. L. R. Cooper. August 20th, 1930. (Cognate application 33,683/30.) (355,509.)

25,325. "Semi-automatic electrically-operated filling and delivery apparatus for liquid or pasty or pulverulent products." A. Vaverka. September 5th, 1929. (355,512.)

25,419. "Electrical control and signalling systems for elevators, hoists, and similar machinery." Westinghouse Electric & Manufacturing Co. August 26th, 1929. (355,513.)

26,591. "Electric measuring instruments." British Thomson-Houston Co., Ltd. September 6th, 1929. (355,529.)

26,600. "Mounting of condensers in ignition magnetos." Fabrica Italiana Magneti Marelli. September 6th, 1929. (355,531.)

26,680. "Electric regulating apparatus." British Thomson-Houston Co., Ltd. September 6, 1929. (355,532.)

26,799. "Vacuum electric switches." International General Electric Co., Inc. September 9th, 1929. (355,535.)

27,295. "Electric sockets." J. Y. Johnson (Arrow-Hart & Hegeman Electric Co.). September 12th, 1930. (355,537.)

27,656. "Electrical range-finding and distance-measuring devices." Telefunken Ges. für Drahtlose Telegraphie. September 23rd, 1929. (355,542.)

27,756. "Oscillation dampers for overhead lines." Siemens-Schuckertwerke Akt.-Ges. February 20th, 1930. (355,543.)

27,900. "Combined audible and visual indicators." Siemens & General Electric Railway Signal Co., Ltd. (J. Parsons). September 18th, 1930. (355,545.)

28,768. "Electrodes for use in electric arc-welding or the fusion-deposition of metals." Quasi-Arc Co., Ltd., and E. F. Newell. September 25th, 1930. (355,552.)

30,396. "Electric current-collectors of the pantograph type." Associated Electrical Industries, Ltd. October 18th, 1929. (355,567.)

32,418. "Illuminated signs." W. T. Akers, C. H. N. Lavender, A. J. Martyn, and W. Woollcott. May 16th, 1930. (Divided application on 25,179/29.) (355,230.)

32,819. "Electric switch mechanism for use in road vehicles, motor boats, and aircraft. G. Fischer and E. Muller. August 26th, 1930. (355,586.)

33,973. "Device for detecting leakage in a vessel containing an electrically-conductive liquid bath." Vereinigte Stahlwerke Akt.-Ges. December 3rd, 1929. (355,594.)

**1931.**

2,218. "A.c. frequency changers." Telefunken Ges. für Drahtlose Telegraphie. January 24th, 1930. (355,636.)

3,415. "Stands for electric irons." Akt.-Ges. Brown Boveri et Cie. February 17th, 1930. (Addition to 6,031/30.) (355,640.)

4,300. "Methods of and means for starting electric motors." British Thomson-Houston Co., Ltd. February 12th, 1930. (355,643.)

20,844. "Wander plugs and like electric terminals." Belling & Lee, Ltd., and E. M. Lee. April 22nd, 1930. (Divided application on 12,423/30.) (355,359.)

20,845. "Wander plugs and like electric terminals." Belling & Lee, Ltd., and E. M. Lee. April 22nd, 1930. (Divided application on 12,423/30.) (355,360.)

32,928. "Electric distributing systems." International General Electric Co., Inc. November 2nd, 1929. (355,120.)

33,916. "Fusible cut-out elements." English Electric Co., Ltd., and A. A. Heath. November 11th, 1930. (355,129.)

34,477. "Gas-blast electric circuit-breakers." International General Electric Co., Inc. November 15th, 1929. (355,133.)

35,609. "Arc-extinguishing fluids." British Thomson-Houston Co., Ltd. November 26th, 1929. (355,145.)

35,786. "Thermostatically controlled electric switches." G. P. Barker (trading as G. Barker. May 27th, 1930. (Divided application on 35,404/29.) (355,147.)

36,330. "Electric arcs for welding and like purposes." Pressluft-Patent-Verwertungs Ges. and E. Wist. December 2nd, 1929. (Addition to 325,132.) (355,153.)

37,364. "Regulating systems for alternating-current generators." Crocker-Wheeler Electric Manufacturing Co. December 18th, 1929. (355,157.)

# Trade Mark Applications

THE following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from September 9th :—

Ostar. No. 523,136. Class 8. Thermionic valves. The firm trading as Gustav Ganz & Co., 45-47 Nullgasse, Vienna, X., Austria. (British representatives: Lloyd Wise & Co., 10, New Court, Lincoln's Inn, W.C.2.)

Rayram. No. 524,726. Class 13. Electric lamps (ordinary). Joseph Weinbaum, trading as the Stormlight Incandescent & Electrical Co., 160-164, Mile End Road, E.1.

## A New Aluminium Alloy

A new light alloy with remarkable properties has been produced by the Metropolitan-Vickers Electrical Co., Ltd., and designated M.V. "C." It is a pure alloy of aluminium and silicon prepared by a new process which has been patented by the company, and it combines to an unusual degree the qualities of strength and ductility, together with excellent resistance to corrosion and good working characteristics both for casting and subsequent operations. The joint efforts of the company's foundry and research staff have resulted in the discovery of a new process of what is called "modification" of the alloy, which consists of adding a reagent to the metal in its molten state, the effect being to produce a fine-grained close-knit microstructure, with a marked improvement in strength, ductility, and other properties. The ultimate tensile strength of M.V. "C" alloy is from 9 to 11 tons per sq. in. when cast and from 11 to 13 tons per sq. in. when chill cast. The material thus meets the requirements of the B.E.S.A., Admiralty, and Air Ministry specifications for alloys of this class. The ductility of the metal, even when cold, is so great that castings of the alloy can be "set" or bent to a considerable extent without risk of damage, and it can be rolled, drawn, spun, forged, pressed, or stamped, even into quite thin sections; when so worked it greatly improves in strength and ductility, machines easily, and can be readily and effectively welded. The resistance of the alloy to corrosion by sea-water renders it particularly suitable for marine service, and it is capable of taking a high polish and retaining it for a long time. The company has now extended its production to supply M.V. "C" alloy to users in other industries, primarily in the form of castings from customers' patterns, but also, if required, in the form of rolled sheet, drawn rods and tubes, spinnings, pressings, or stampings. On account of its lightness the alloy is cheaper than brass, while further savings result from its low cost of machining and handling.

# New Work for Contractors

## Particulars of new works and building schemes for the use of electrical installation contractors and traders

*Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.*

**Aberdeen.**—Elementary school, Tyrie; Bennett, Mitchell & Son, architects. R.C. school, King's Crescent; executive officer to the Education Authority.

**Alloa.**—Garage for W. Alexander & Sons, omnibus proprietors, Falkirk (£6,000); the manager.

**Ayrshire.**—Telephone exchange at Saltcoats; architect, H.M. Office of Works, 122, George Street, Edinburgh.

**Barnsley.**—Houses (80), Shepherd's Farm estate; borough engineer.

**Beaminster** (DORSET).—Houses (60) for the R.D.C.; surveyor.

**Birkenhead.**—Central school, Rock Ferry, and craft block, Brassey Street schools, for the borough E.C.; R. W. Johnston, education architect.

**Blackpool.**—Church, Stoneycroft Avenue, South Shore; Parker & Sons, builders, Oxford Avenue, St. Anne's-on-Sea.

**Bradford.**—Alterations, Wellington Road School and Allerton School; city architect.

**Buntingford** (HERTS).—Post Office for H.M. Office of Works, King Charles Street, London, S.W.

**Burnham** (BUCKS).—Telephone exchange for H.M. Office of Works, King Charles Street, London, S.W.

**Burton-on-Trent.**—Shops, Market Place; R. Sydney Litherland, architect, 10, High Street.

**Cambridgeshire.**—Village college, Impington casual wards, Chesterton Institution, and police station, Soham, for the C.C.; H. H. Dunn, county architect, Cambridge.

**Carlisle.**—Extensions to Currock Road for Nestlés & Anglo-Swiss Milk Co.; H. Foxall, architect.

**Cheshunt** (HERTS).—Halsey Masonic Hall; Wallace & Wallace, builders, Woodford Green, Essex.

**Chesterfield.**—Houses (28), Highfield estate; W. A. Derbyshire, architect, Gluman Gate.

**Chester-le-Street** (DURHAM).—Alterations to the Red Lion Hotel; Cowe & Lawson, architects, Central Chambers. Sewage works for the U.D.C. (£36,000); G. Bailey, Ltd., contractors, King Street, South Shields.

**Coventry.**—School, Moseley Avenue, for the city E.C.; director of education.

**Crawcrook-on-Tyne.**—R.C. school (230 places); W. Charlton, builders.

**Dagenham.**—Library; U.D.C. surveyor.

**Darton.**—Houses (34); W. Butterley, surveyor to the U.D.C., Council Offices.

**Darwen** (LANCS).—Congregational church, Highfield; J. Berry Thornley, architect, 45, Market Street.

**Derby.**—Houses (602), Normanton, for the T.C.; borough surveyor.

**Dewsbury.**—Bazaar premises, Westgate, for Marks & Spencer, Ltd., 21, Chiswell Street, London, E.C.

**Durham.**—School, Burnopfield (£14,200) for the C.C.; J. W. White, contractor, High Barnes, Sunderland. Extensions to Hatfield College (£15,000); H. Kelly, Ltd., contractors, St. Mary's Place, Newcastle.

**Eastbourne.**—Clinic, with nurses' and caretaker's quarters, adjoining Avenue House, St. Leonard's Road, for the B.C.; borough engineer, Town Hall.

**East Grinstead** (SUSSEX).—Development of estate at Shovelstrode, with electrical work, for Mr. Behrens; Coleridge, Jennings & Solmenow, architects, Westminster, London, S.W.

**East Stow.**—Houses (36) for the R.D.C.; surveyor, Stowmarket.

**Evesham.**—Cinema theatre, corner of Port Street and Burford Road, for V. A. Morrall and F. M. Stubbs.

**Glasgow.**—Catholic church of St. Thomas's, at Riddrie; D. Cameron, architect, 183, West George Street. Extensions to 19, Gordon Street, for J. Craig (Glasgow), Ltd., 10, Woodlands Road; Melville, Dundas & Whitson, builders, 224, St. Vincent Street.

**Great Wyrley** (STAFFS).—Branch for the Walsall & District Co-operative Society, Ltd.; J. R. Deacon, builders, Algernon Street, Walsall.

**Guisborough** (YORKS).—Sewage works for the R.D.C.; D. Balfour & Son, engineers, 3, St. Nicholas Buildings, Newcastle-on-Tyne.

**Hastings.**—Children's home, Ashburnham Road; Corporation Assistance Committee.

**Herne Bay** (KENT).—Church, Herne, for the Congregational Trustees; secretary.

**Hertfordshire.**—Additions, Shrodells Institution, Watford, for the C.C.; A. Saxon, Snell & Phillips, architects, 9, Bentinck Street, London, W.1.

**Hinckley.**—Primitive Methodist church, Stoke Golding; trustees.

**Hopetown** (YORKSHIRE).—Church, Brinkburn Road; J. J. Airy, builders, Mowden Terrace, Darlington.

**Horley** (SURREY).—Houses (40) for Reigate R.D.C.; surveyor.

**Huddersfield.**—Houses (198), Northgate & other estates; borough architect.

**Hull.**—Re-erection of printing works for Goddard, Walker & Brown, Ltd., Market Place.

**Hythe** (HANTS).—Wesleyan church, Hardley; Ernest Bowman, builder.

**Inverness.**—Church; R. Tinnock, 8, Mitchell's Lane, Porterfield Bank.

**Irish Free State** (CLONMEL, CO. TIPPERARY).—Houses (32) for the Corporation; borough surveyor, Town Hall. (DUBLIN).—Heating installations and electric lighting, at the Record Treasury, Four Courts, for Board of Works; T. Cassidy, secretary, Public Works Office.

**Isle of Man.**—Grammar school, Ramsey; Pearson, Son & Duffy, architects, 18, Dalton Square, Lancaster.

**Lanarkshire.**—Police station with houses, at Biggar (£3,070); the chief constable, Hamilton.

**Leeds.**—Additions and extensions to the Catholic schools of Mount St. Mary; Pickard & Co., builders, of 8 and 10, Dorrington Street.

**Leicestershire.**—Two schools, Melton Mowbray (£40,000), for the county E.C.; Orton & Co., builders, Coalville.

**Leigh.**—Houses (90); T. A. Clare, borough engineer.

**Lincoln.**—Re-erection of showrooms and offices, St. Benedict's Square, for W. I. Binks & Co., automobile engineers.

**Liverpool.**—Houses (246), Speke Road, Garton, for the Corporation Housing Committee; director of housing, Municipal Buildings, Dale Street. School, Lambeth Car Sheds site; director of education, Education Offices, Sir Thomas Street.

**London** (BERMONDSEY).—Rehousing, including shops and warehouse, Vaughan Street (£17,190); Corporation works manager. (ROTHERHITHE).—Flats (44), Rotherhithe Street area; Bermondsey Corporation works manager. (WALTHAMSTOW).—Town Hall; borough engineer.

**Maldon** (ESSEX).—Reconstruction of Walton Hall, Purleigh, for A. Barber.

**Malvern** (WORCS).—Houses (74) for the U.D.C.; surveyor.

**Manchester.**—Nursery school, &c., Ancoats (£13,600); city architect.

**Market Rasen** (LINCS).—Houses (24) for the U.D.C.; surveyor.

**Middlesbrough.**—Additions to St. Mary's College, Eastbourne Road; Kitching & Co., architects, 21, Albert Road.

**Monmouthshire.**—Extensions to secondary school, Chepstow; county architect.

**Newcastle-on-Tyne.**—Alterations to Heaton Assembly Rooms; J. McFadd, contractor, 30, Heaton Road. Premises, Northumberland Street, for Modes, Ltd., of London, W.1; North, Robin & Wilsden, architects, Townsend House, Greycoat Place, London, S.W.1. Rebuilding of Poor Children's Holiday Association premises; Cackett, Burns, Dick & McKellar, architects, 21, Ellison Place, Newcastle.

**North Ireland** (BELFAST).—Extensions to the Forster Green Hospital for Consumption, Fortbreda; H. & J. Martin, Ltd., 163, Ormeau Road.

**North Riding.**—Additions to the County Hall, Northallerton (£15,000), for the C.C.; J. R. White and J. G. Wrigley, county architects, Northallerton.

**Paisley.**—Shops and showrooms for Paisley Co-operative Manufacturing Society; H. Neil, architect.

**Perth.**—Art gallery and museum; Smart, Stewart & Mitchell, architects, 40, Tay Street.

**Pickering** (YORKS).—Conversion of Poor Law institution into children's home for the North Riding C.C. (£6,000); G. Davy, surveyor to the Council.

**Plymouth.**—Alterations to the Head Post Office, for H.M. Office of Works, King Charles Street, London, S.W.

**Portsmouth.**—Houses (21), Butts Road; G. McCormick & Son. Additions, 84, Kingston Road; Portsmouth Hostel for Boys. Bank, High Street, Cosham, for the National Provincial Bank Ltd.; A. E. Porter & Son. Central fire station, Park Road depôt site; city engineer. Alterations and additions, Eastney Cinema, Eastney Road; H. J. Cook. Reconstruction of Theatre Royal, Commercial Road, as cinema; Portsmouth Theatres, Ltd.

**Preston.**—Premises for the Preston Industrial Co-operative Society, Ltd., Moor Lane; T. Turner, builders, Bamber's Yard.

**Redcar.**—Extensions to the R.C. day school; Kitching & Co., architects, 21, Albert Road, Middlesbrough.

**Retford.**—Schools (£17,000) for the borough E.C.; Henry James, Junior, builder, Mansfield.

**St. Ives** (HUNTS).—Hospital extensions, with lift; O. Staines, builder, Fincham.

**Skegby** (NOTTS).—Houses (100) for the R.D.C.; L. Dodsley, architect, Sutton-in-Ashfield.

**Smallburgh** (NORFOLK).—Houses (66) for the R.D.C.; surveyor, Stalham.

**Southampton.**—Grammar school, Hill Lane, for the E.C.

**South Kesteven** (LINCS).—Houses (43) for the R.D.C.; surveyor, Bourne.

**Southport.**—Technical college for the E.C.

**Stockton-on-Tees.**—Municipal offices for the T.C.; Lanchester & Lodge, architects, 19, Bedford Square, London, W.C.

**Stroud** (GLOS).—Houses (36), Rodborough, for the R.D.C.; R. Bird, surveyor, Kendrick Street.

**Teesdale.**—Installation of electric lighting at the Barnard Castle Council School for the E.C.

**Upleatham** (REDCAR).—Church for the Whitby, Darlington, and District Wesleyan Church; Rev. A. E. Guile, 161, Coniscliffe Road, Darlington.

**Warrington.**—Premises, Westy Lane housing estate, for the Co-operative Society, Ltd., Cairo Street; architect's department, Co-operative Wholesale Society, Ltd., Balloon Street, Manchester.

**Westmorland.**—Houses (40), Patterdale, for North Westmorland R.D.C.; A. Knewstubb, architect, Penrith.

**Weston-super-Mare.**—Convalescent home for the Birmingham Hospital Saturday Fund; Bryant & Sons, Ltd., builders, Whitmore Road, Birmingham.

**West Riding.**—Senior school (800 places), Bridlington (£35,000), for the county E.C. Extensions to the Marlborough Grammar School; P. King, builders, River St., Pewsey, Wilts.

**Whitchurch.**—Primitive Methodist church, Prees Green; trustees.

**Winterton** (SCUNTHORPE, LINCS).—Houses (32), Roxby Road, for the P.C.; clerk.

**Woodchester** (GLOS).—Factory for the Gloucestershire Incubator Co., Ltd.

**Woodford** (ESSEX).—Houses (54), Hillside estate; Estate Co.

**York.**—Houses (182), Garrow Hill estate; city engineer. Extensions, county hospital; E. Stanley Hall, architect, 54, Bedford Square, London, W.C.